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The application of color to antique Grecian architecture

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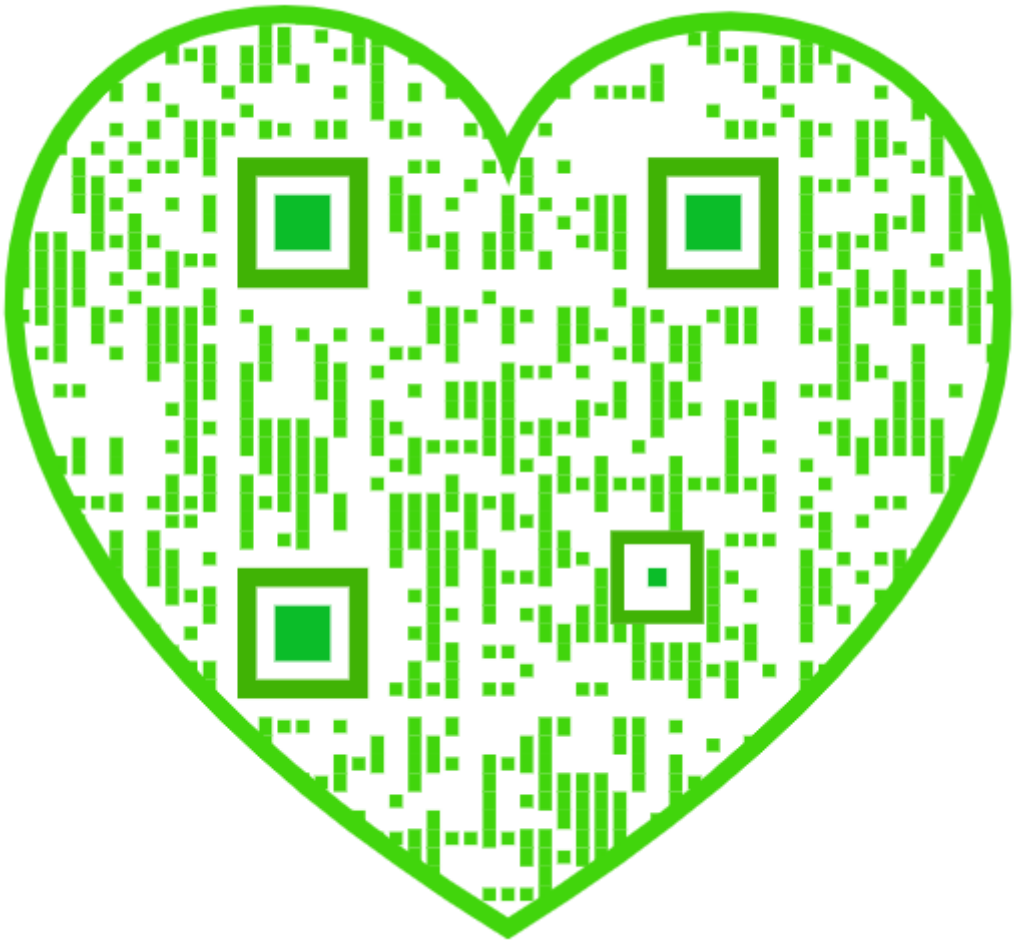

THE APPLICATION OF COLOR TO ANTIQUE GRECIAN ARCHITECTURE

BY

ARSELIA BESSIE MARTIN

B. S. University of Illinois, 1909

THESIS

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THE APPLICATION OF COLOR TO ANTIQUE

GRECIAN ARCHITECTURE

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THE APPLICATION OF COLOR TO ANTIQUE GRECIAN ARCHITECTURE

INTRODUCTION

Whenever we are confronted by a new problem, it is our first impulse to seek an analogous problem in the past, and to determine, if possible, the method and the result if its solution. It is right that we should do so in order that we may avoid useless mistakes. The problem now confronting the architectural world, from an esthetic standpoint, is the proper treatment of large surfaces unbroken by joints and of an uninteresting color. An investigation of the manner in which these surfaces have been treated in the past, particularly by the application of color, does not seem to us untimely. We have chosen to study the uses of color on antique Grecian architecture, because we believe that from this source, so fertile for former generations, and to which we already owe much of the inspiration of our noblest monuments, we may be able to deduce some eternal principles, that may be of value to our own generation and in our problems.

The subject has not been undertaken in a purely archaeological spirit, nor with any idea of reviving a past style, but our desire is to search for the truth as far as possible, and truth is always profitable. We do not presume to say that the ancient Greeks set up a standard of color decoration that we should follow, neither do we wish to condemn their system as a relic of barbarism.

Who are we to pass judgment on the practices of an art beyond our comprehension in its refinements? Our own color sense is sadly deficient, our theorists cannot even agree. Reber has wisely remarked "that our unsettled esthetic feeling no longer understands many things that Grecian taste loved and approved, and that critical feeling is most deceptive in questions of the history of art."

The bitter controversies on the subject of Grecian polychromy, that prevailed during the greater part of the last century, have finally subsided, so that we may now review the subject with a calm and unbiased mind. Numerous archaeological researches make it possible to collect and compare the confirmed facts; it is no longer a field of pure speculation, but one of scientic interest.

We shall endeavor to inquire into the relations of this phase of Grecian art to those of the preceding and of the later styles. Was their system of polychromy a native invention, having no connection with the past, intended only for the existing generation, then to be extinguished in the darkness ? If so, it could possess little interest and real value for us, except as a mere historical fact. On the other hand, if it was evolved from ages of experiment and slow development, attaining finally a high point of perfection and then exercising an influence, unconscious or otherwise, on succeeding ages, there must have been in it some vital elements that are worthy of our consideration.

Finally, if for no other reason, we feel justified in the selection of this subject because a proper understanding of it is indispensable to the true appreciation of Grecian architecture, to which we owe so much.

To more fully understand the importance of the subject, it

is fitting that we should review the history of the controversy concerning it.

Section I

Historical Review of the Controversy

The theory long prevailed, that Grecian art was entirely restricted by considerations of form, and that perfection of form and color were impossible together in any art; it was deeply rooted and died hard, if indeed it has entirely vanished yet. In the Renaissance period were many classic works extant, from which all traces of color had disappeared. When others were exhumed, the color preserved by the earth must have been removed in the cleaning, or if not immediately removed, it must have disappeared in a very short time, as recent discoveries have shown. The humanists prized antiques merely for their beauty, but had no scientific interest in them; hence the scanty remains of color which could not have been very attractive then, would naturally be considered as a blemish. Neither did they hesitate to restore mutilated sculptures according to their own taste, and as seemed proper to them, much to the detriment of the science of archaeology and the proper understanding of Grecian art.

The general use of color in the architecture and sculpture of the Middle Ages may possibly have resulted in this idea of the separation of form and color, when the spirit of the Renaissance revolted from the long established order.

It required a vast amount of courage to attempt the destruction of the prevailing conception of a Grecian temple as a dazzling mass of whiteness, and when a few brave artists and archaeologists attacked this early in the 19th. century, a storm of opposition arose such as scarcely ever known in the art world.

Wincklemann, called the "father of archaeology" (1717-1768),

in his History of Ancient Art (Paris, 1802), mentioned the gilding of hair and draperies on some statues, and hinted that it was not improbable that the Greeks colored their sculptures; but he evidently did not consider it necessary, or he may have lacked the opportunity to investigate so important a subject.

Not long afterwards, Quatremere de Quincy produced a monumental work on"Le Jupiter Olympien", or the art of antique sculpture considered from a new point of view: "work which comprises an essay on the taste of polychrome sculpture". He sought in this to support and defend polychrome sculpture to the extent that he caused a change of opinion, so that some persons advanced far enough to see in Grecian sculpture "an imitation of nature carried to a complete illusion." Voelkel even expressed the opinion, that not only did the Greeks use local color on their statues but that they painted them with complete effects of light and shade. The folly of this idea created many enemies to the polychrome system. The majority of thoughtful persons were not persuaded that color was used on sculpture, beyond a few minor details.

Stuart collected a few simple items of color remaining on architectural members, but he did not interest himself much in the subject, not regarding it as a vital principle in Grecian architecture. (Stuart and Revett's "Antiquities of Athens", French ed., 1808, new English ed., 1835) Donaldson was the first to observe that the walls of the Theseum in Athens had been dressed with the point to receive a coating of stucco or plaster, so that the whole could be painted. Cockerell made some early and valuable observations of color on the monuments, especially the Temple of Jupiter at Egina, but he did not comprehend the spirit of Grecian

polychromy. Even at the middle of the century, when so much had been established, he remained of the opinion that the "application of polychromy to marbles was to paint the lily and gild the rose." (The Builder, 1852)

The first person to publish a complete system of Grecian polychromy, and to vindicate it as an important element of architecture, was M. Hittorff. In 1823-24, he visited Sicily to study the remarkable ruins with which the country is covered, and he was impressed by the numerous remains of color found on the ancient fragments there. He undertook the task of restoring the Temple of Empedocles, a very small edifice on the Acropolis of Selinuntum. The colored drawings of this restoration were first exhibited in Berlin, where they created great enthusiasm among the younger architects. Soon afterwards, in 1830, he read before the Academy of Inscriptions, Belle-Lettres and Fine Arts of Paris, a paper on the Polychrome Architecture of the Greeks. (Published in Instituto Archaeologico Annali, Rome, 1829-30. This was only an extract from his work on L'Architecture Antique de la Sicile, which he was preparing at the time, but which was not completed until after his death and published in 1870. The plates were issued in folio, Paris, 1829.) The exceedingly bold conclusions deduced by Hittorff, that the Greeks colored all the parts of their buildings, was the signal for the beginning of the literary strife.

Raoul-Rochette, a French archaeologist, in his "Essai sur la Peinture sur Mur des Anciens", made an important attack on Hittorff's theory concerning the painting of all architectural members and particularly on mural painting. Some very learned and interesting arguments, including philological interpretations of the

writings of the ancients, were published on both sides. They are now interesting only as a matter of history, but have lost their value in the light of later discoveries.

In "Lettres d'un Antiquaire à un Artiste, sur l'emploi de la peinture historique murale dans la decoration des temples et des autres edifices edifices publics et particuliérs, chez les Grecs et chez les Romains" (Paris, 1835), Letronne defends polychrome architecture, especially in relation to the interior of the temples. His arguments are largely based on conclusions drawn from philological researches and are exceedingly tiresome to one who does not read Greek.

For several years, and during the third decade, a continuous series of articles was published, particularly in France and Germany, principally composed of arguments and rebuttals on both sides. Hittorff found many sympathizers as well as many opponents. Archaeologists continued their explorations and new facts were constantly being established. Donaldson and Owen Jones attempted some colored restorations of the Parthenon.

Semper seized upon Hittorff's theory with the greatest joy, insisting that color extended over all the surfaces of Grecian monuments, even the marble buildings of the Periclean age in Attica, and that even the parts intended to be white were painted. He expressed surprise that moderns had paid so little attention to the important matter of polychromy, " a knowledge of which was indispensable to the proper understanding of antique architecture." (See "Vorlaufige Bemerkungen über bemalte Architectur und Plastik bei den Alten", 1834) The colored drawings which he exhibited at Berlin received the same enthusiasm as those of Hittorff's. In

fact so much enthusiasm abounded that Raoul-Rochette was impelled to speak rather contemptuously of this "thoughtless enthusiasm of young artists, who take their feelings for facts, their illusions for realities; who, in short, see the antique monuments as they suppose them to be, and who would restore them as they would see them ." There is no doubt that the Frenchman's severe criticism was just, but his opposition to the idea of the Greeks' coloring their architecture was extreme. Semper's restorations he called "daubs of red and blue".

Kugler, a conservative adherent to the old idea of the "purity of classic form", admitted the use of some color on sculptures, such as details of the hair, eyebrows, etc., and in archaic works only, on the lips, also on certain details of the draperies. He rejected Semper's idea of the coloring of the entire marble surfaces, but admitted the painting of single architectural details. While he was not prepared to dispute the painting of large surfaces on the monuments of Sicily, yet he considered that if they were so treated, it was only because of the inferior tastes of the colonists. In his work "Ueber die Polychromie die Griechischen Architektur und Sculptur, und ihren Grenzen" (Berlin, 1835), he draws the positive conclusion, "that what was constructed during the brilliant period of Grecian art in Parian marble, and as a necessary consequence also, in all white marble, particularly at in Athens in Pentelic marble, was allowed to retain essentially its external white appearance." He argues that, although Vitruvius mentions that the ancients covered the ends of the beams (triglyphs) with blue wax, yet he referred only to a primitive custom, that had no connection with Periclean architecture. Concerning the Doric or-

der, Dr. Kugler held the opinion, that the metopes were colored to set off the white sculptures, but the triglyphs must have remained white.

The question, "Les Grecs, ont-ils peint l'extereur des monuments construits en marbre blanc ?" (Journal des Savants, June and July, 1837), was learnedly discussed by Letronne, who agreed with Kugler in respect to large, undecorated surfaces, but he believed that the Grecian taste would not have endured the glare of the white marble, and it must have been softened by some tinting like encaustic wax, which would have produced the golden tint found on numerous marble fragments.

Investigations of the actual remains of color were carried on so vigorously and so much could be proved that today there can be no doubt that the Greeks were fond of color, and used it as an important element of their architecture.

In 1852 there appeared the most important and extensive work that has yet been published on the subject, "L'Architecture Polychrome chez les Grecs", by J.J.Hittorff. In this monumental work he considers in the first part, the discovery of polychrome architecture, and gives an analysis of the discussions and principal writings on the subject; part two is devoted to a description of the restoration of the Temple of Empedocles. That his restoration was founded on fair proofs and analogies, we cannot dispute, although we may object to some things on the ground of taste. Part three contains a discussion of the material means employed in antiquity in the application of polychromy to architecture, sculpture and mural painting; also relating to these practises in modern times and their suitability, as well as to the manner of adapting

these systems of decoration to the edifices of our own times. Part four consists merely of a detailed description of the twenty-five colored plates accompanying the text, and which contain illustrations of the remains of architecture, sculpture and painting collected in support of this restoration, as well as the permanent existence of polychrome architecture among the Greeks.

In spite of the multitude of proofs brought to light by Hittorff and others before the middle of the last century, the question remained indeterminate, and although the majority adhered to the positive side of the question, there were yet many persons of deep learning, too conservative to accept it unreservedly. Cockerell, as we have already mentioned, was one of the latter class. Some denied that the Greeks had any sense of color, and asserted that "if it could once be proved that the Greeks pursued this system of polychromy, it would be derogatory to our art, and that the Greeks' knowledge of the true principles of art was inferior to our own. That polychromy is revolting to the dignity, grandeur and simplicity of a noble art, and that the Greeks would have enerdetically opposed such a system." (Mr.J.B.Waring in discussion at the meeting of Royal Institute of British Architects, pub. in The Builder, 1852) Others held that if the Greeks used color in external decoration, it was "the expression of a frivolous and worldly, not to say sensous religion."

Some cautious persons ventured the opinion that colors, if used at all by the Greeks, were of quiet and subdued tones, a principle which we know by positive proof was untrue and was quite foreign to the Greek temperament.

By the year 1870, the intense feeling had somewhat subsided,

although the question was not yet settled. In the introduction to Book Nine, "L'Architecture Antique de la Sicile" (1870), Hittorff wrote thus : "The decoration of the Grecian temples by painting and painted sculpture has today arrived at the state of an actual fact; the recollection of the violent criticisms to which this doctrine exposed some of us, and the first application of it which we attempted on the monuments of Sicily has already been effaced;.... if one still doubts, it is especially in questions of detail".

Some excavations on the Acropolos of Athens in 1883 revealed some important archaic sculptures which showed numerous vestiges of color. This aroused the question of polychrome sculpture, and it became popular, much interest being exhibited by American artists.

The French explorations at Delphi have since thrown additional light upon color decoration. That the subject is still of interest is shown by the important place assigned to it in two recent works: Curtius & Adler's monumental work on Olympia,(1897); and Furtwaengler's Aegina, containing some restorations,(1906). The latter is rather conservative.

Durm's third edition of "Baukunst der Griechen" (1910) contains a good brief summary of the polychrome system as it now generally accepted.

SECTION II

A Review of the Earlier Styles of Polychromy

A. Egyptian

"For the decoration of the vast surfaces, either plain or curved, which their style of architesture placed at their disposal, the Egyptians made use of paint. They overlaid with a rich system of color the whole inside and outside of their buildings, and that with no desire to accentuate, by a carefully balanced set of tones the great constructive lines, contours and mouldings, nor with any wish to produce a complicated polychromatic ornamentation." (Perrot & Chipiez, History of Art in Ancient Egypt, Vol.I, p.119)

The psychology of Egyptian color is generally explained as due to the brilliant sunlight. The science of optics explains that the more intense the light, the more pleasure does the eye receive from strength and variety of colors.

The Egyptians understood how to make various tones accent the different parts of a structure and to protect its contours from the effect of a dazzling light. "To Egypt, then belongs the credit of having been the first to discover the obligation imposed upon the architect by the sunlight of the south,- to accent the main lines of his edifice by means of color." (Perrot & Chipiez, p.125)

All the architectural forms were painted; the base of the column rising in graceful lines above it from a row of painted yellow leaves with red, blue and green stripes. The shaft of the column was usually decorated by figures and inscriptions in brilliant colors on a white ground. The necking was sometimes marked by vertical, sometimes by horizontal lines in strong green, red and blue without the use of yellow and white, so that it was in direct con-

trast to the shaft. The capitals were frequently decorated by lotos forms (the bud or bell capital), which were painted in gay colors. The entablature consisted of the architrave and simple cavetto cornice, without an intervening frieze, and was also decorated: the architrave being usually with colored inscriptions; the cavetto of the cornice was marked in vertical stripes in groups of three's -- blue, green, blue, alternating with blue, red, blue--, separated by cartouches of the king's name in lighter colors on a white ground. The bead below the cavetto was striped blue green and white. (From the Temple of Medinet Haboo, B.C. 1200, Pennethorne) Pennethorne sees some analogy between the treatment of the Egyptian cornice and the Doric frieze, the groups of three stripes corresponding to the triglyphs, and the cartouches between the groups representing the sculptured metopes. Also the architrave, decorated only by the inscriptions was analogous to the Grecian architrave which was usually free from all ornamentation save inscriptions and trophies.

The striking characteristic of Egyptian art is the subordination of sculpture and painting to architecture. The wall is the principal thing, the sculpture and painting on it serving to emphasize this fact. Tradition kept naturalism within bounds, and a minute division of labor served to stereotype the forms used in decoration. Paintings and reliefs were represented in outline and flat colors without any effects of perspective or chiaroscuro. The compositions were not in separate and complete pictures within certain limits, but were arranged in horizontal tiers covering an entire wall, the wider tiers below, narrower ones above. Larger figures, symbolizing the ranks of persons represented, now and

then interrupted the continuity, so that the general scheme was governed by no severe principle of regularity. This system of sprinkling figures promiscuously over all the surfaces was peculiar to the Egyptians. (Woltmann & Woermann's History of Ancient Painting)

Both interiors and exteriors were profusely decorated. Dadoes friezes and rich ceiling ornament gleamed with brilliant colors.

Egyptian coloring was largely symbolical. In general, it was applied on the principle of imitating nature, marked deviations from the colors of nature being found in the representations of the divinities, which were painted red, yellow, green or blue.

The colors used were yellow, red, blue, green, and brown, all in several varities, also white and black.. Some of the pigments were vegetable, like indigo; others were mineral. A certain blue which has kept its original brilliancy for many centuries was composed of sand, copper filings and subcarbonate of soda reduced to powded and burnt in an oven. This blue did not blacken with exposure to the air or turn green. Different shades of yellow and brown were obtained from ochres. The deep yellow, almost chrome, together with the brilliant green, was characteristic of Egyptian polychromy. The whites, formed of lime, plaster, or powdered enamel, have sometimes preserved a wonderful snowy whiteness. Colors laid over this white became more brilliant. Champollion (Lettres d'Egypte et de Nubie) says that the violet sometimes found was not originally that color, but the result of time on the surfaces originally gilded. The colors have in many places preserved their originally brilliancy, but most of the gilding, which was pretty generally used to give warmth and brightness, has disappeared. The important use of gold

is known chiefly by inscriptions.

The paintings were generally executed in distemper on stucco. One authority insists that there was always a layer of stucco even upon the beautiful granite of the obelisks. The use of this fragile material, as a ground for the rich decoration applied to it, is in direct opposition to the principle of absolute stability, which the Egyptians sought in their construction. The use of encaustic painting, in which wax and naptha were used, has been proved, but process was not much developed until after the Macedonian conquest. (Perrot & Chipiez, History of Art in Egypt, Vol. 2) Some Egyptian paintings were covered by a resinous varnish, which has blackened with time and spoiled the colors on which it was laid.

Most of the decorations were first incised upon the wall and the outlines filled with colors laid flat. Thus painting was secondary to sculpture. In some of the tombs, however, the painter alone executed the decorations without the aid of the sculptor, and this is probably the only really independent painting that Egypt produced.

B. Chaldea and Assyria

In Mesopotamia, as in the valley of the Nile, architecture was the ruling art to which painting and sculpture were subordinated.

The use of a natural polychromy marked the Assyrian system. Colored stones, gold, silver, bronze, etc., were used in constructing the statues, which were identical in principle with the chryselephantine sculptures of the Greeks.

The glazed and enamelled tiles were the important new fea-

ture in architectural decoration. The walls of sun-dried bricks were covered with tiles and the decorations were painted directly on them. Unlike the Egyptians, the Assyrians did not cover their architectural surfaces entirely with decorations, but exercised a greater reserve. Only certain parts of the constructions were ornamented, such as the friezes, relief bands, archivolts, panels, etc. The Temple at Khorsabad, which is unique, had each of its seven stories painted a different color,-- white, black, red, blue, vermillion, silver and gold, in sequence from the ground upward. The monotony of these monochrome surfaces was doubtless counteracted by aerial effects, but we are unable to judge of the esthetic value of them.

Fresco paintings in vivid colors were also used, although there are few remains of them. When first found, they showed some colors as dim shadows, which disappeared almost immediately when exposed to the air. The paintings on plaster were usually reserved for inside walls, although Place shows them externally on his restorations of Khorsabad. The primeval cities of Chaldea retain no traces of painting applied to the external walls, but the interiors show vestiges of paintings on a plastered surface.

The excavations prove that the sculptured reliefs were colored, although Place (Ninive et Assyria, Vol. 2) concludes that the use of color was somewhat restricted; that it was used only for detaching, giving and giving value and adding proper touches to the accessories; that the nude parts, the grounds and the draperies were uncolored, thus leaving the greater part of the stone in its natural color.

The colors used by the Mesopotamian architects were few, al-

though we have reason to believe that the wonderful vegetable colors, with which the present inhabitants of that country dye their textile materials, were not unknown to the ancient people. (See Perrot & Chipiez, History of Art in Chaldea and Assyria, Vol. 2) The colors most used were blue and yellow, the backgrounds usually being blue with yellow figures. Certain details were in black or brown and white; green was rarely used. Afragment of a painting on stucco from Khorsabad shows figures surrounded by a strong black outline relieved on a green ground. The figures were sometimes painted on a ground of pale olive or of a reddish hue. Pure red was used sparingly, only in a few ornamental details, such as parts of the royal headdress. Orange and lilac were used in the plumes of the winged monsters. The brilliant blue used on the enamelled bricks, two cakes of which were discovered by Place, proved by analysis to be lapis-lazuli reduced te a powder. This powder united with the clay by firing and gave a solid enamel of a very pure color. The yellow, differed from the ochre of the Egyptians and Greeks , and is an antimonate of lead containing a certain quantity of tin, its composition corresponding to what we know as Naples yellow. (Perrot & Chipiez) The white is an oxide of tin. The green may have been obtained by a mixture of blue and yellow, as ochre with oxide of copper. The red of Khorsabad was an oxide of iron, like our red chalk.

The use of color was purely decorative without any attempt to imitate the real colors of nature. "The resulting conventionalism did not rest on authoritative laws, as in Egypt, but on natural limits of their powers of representation." (Woltmann & Woermann, History of Ancient Painting) The figures were surrounded by a

heavy outline, as in certain mediaeval paintings, except that the outline was generally light instead of dark. There was neither chiaroscuro nor perspective, although the treatment of landscapes shows some feeling for the latter.

It was in the marvallous coloring of their textiles, that the Assyrian love of color was best displayed. The colors, at once soft subtle and brilliant, have been handed down through the centuries, and are even now the despair of the modern chemist.

C. Primitive Greece

In the Pre-Homeric ages in Greece an independent art was developed which was untouched by Oriental influences.

The excavations during the last quarter century have revealed many interesting facts concerning the popychromy of this period. The buildings were constructed principally of rubble or sun-dried bricks, which required a plaster covering and this in turn called for color. Both a natural and artificial color system was used. In Troy, the feeling for color was more or less quiescent; surfaces were generally dull and gray, relieved only by naturally colored materials. In Tiryns and Mycenae, color was more generally appreciated. In the women's apartments of the Royal Palace in Tiryns were found in place the remains of ancient stucco with painted decorations. In other places are clay coatings up to 3.15" thick, covered by neatly smoothed plaster, and decorated by paintings.

The chief efforts of the painter were centered on those parts of the edifice, not exposed to the weather. The stone foundation was marked by a special polychrome treatment, which may possibly have been the origin of the Grecian dado. The decorations were in

the form of horizontal bands in groups of varying widths, principally red and blue, detached rosettes and the scroll ornament. At an early date, the painter began to be dissatisfied with purely geometrical designs, and he turned his attention to nature, where he studied variety in leaves and flowers, in the lower animal forms such as mollusks and butterflies, coming finally to quadrupeds and then human forms. Scenes of war and hunting came to be favorite subjects, according to fragments found at Mycenae. In one of the hunting there are shown three monsters with asses heads carrying a long pole on their shoulders, - monsters no other than the ancestors of the satyrs and fauns of Greek poetry. (Perrot & Chipiez, Art in Primitive Greece, Vol. 2, p.340) In the palace at Tiryns was discovered a famous fresco showing a bull painted yellow on a bluish ground, madly galloping, and pursued by a hunter wearing shoes slightly turned up at the toes. (These shoes are interesting because they were characteristic of the Hittites.)

The floors were usually decorated with some color. At Mycenae a floor was paved with alabaster flags around the sides, but the center was of concrete with a checkered pattern of red and blue in pleasing contrast with the yellowish band surrounding it. The ceilings were elaborately ornamented, as for example, the alabaster relief ceiling from Orchomenos.

The fresco process of painting was used at an early date but distemper was also practised. The colors, which in some cases were quite brilliant when found, disappeared almost immediately when exposed to the air. White, dark brown, pale yellow, chalky red and bright blue were found, but there was no genuine green other than that caused by exposure. (Perrot & Chipiez, Vol.2, p.508) If Myce-

nean art was influenced by Egyptian art , as Durm implies, it is strange that we do not find the brilliant greens and yellowa so chracteristic of Egyptian polychromy.

The Mycenean artist worked in free hand directly on the wall, which he was decorating. When he made a mistake or thought he could improve his proportions, he covered the first with paint and began anew. His works thus show a spontaneity and charm, lacking in the Egyptian and Assyrian styles but which characterized Hellenic art. He also had a genuine feeling for life, a superabundant feeling, in fact, as shown in the extreme liveliness of some of the figures.

The sculptures of the period also differed greatly from those of Egypt and Assyria, -- even in the very early works, the contour of the figure, the well proportioned profile and the straight nose seem to point to the future style of Greece. The arrangement of the hair in a knot on the neck was in vogue in the archaic Grecian sculptures.

The natural polychromy comprised the use of bronze, gold, colored marbles and glass. In one example the translucent whiteness of alabaster was associated with the flash of artificial gems. The eyes of scrolls and volutes were frequently marked by colored stones or glass, - a custom which obtained favor in the Ionic period of Grecian architecture.

In the Lydian Age, the tombs of Sardis show their sculptures touched with strong lines of color, black and bright red predominating.

SECTION III

Derivation of the Grecian Style of Polychromy

Now that we have reviewed the three principal styles of polychrome architecture which preceded the Grecian, we may properly inquire into the derivation of the latter. Did it come from Egypt or Assyria, or was it renascent and further development of that early style, that flourished and decayed on Grecian soil centuries before the Dorian invasion (1100 B.C.)? Or was it derived from the inner consciousness of the native artistic genius of the Greeks which demanded the use of color on the buildings of their own creation?

We have already mentioned Pennethorne's far-fetched analogy between the Egyptian cornice and the Doric frieze. He became convinced, after a special investigation and comparison, that the Grecian ideas of color, as well as the origin of the ornaments used in Grecian architecture, were derived from the same Egyptian source. While there may be no doubt that some, at least, of the forms of Grecian ornament were of Egyptian origin, we are not prepared to accept as final and without question Mr.Pennethorne's conclusions concerning the origin of Grecian polychromy.

Hittorff supposes that the wooden idols brought from Egypt by the early Greeks were painted, and that the wooden temples erected over these idols were treated with the colors which they suggested as a preservative measure. (The theory of a stone derivation of architectural forms, ably defended by Viollet-le-Duc and Raoul-Rochette early in the last century, had to yield after the excavations made by Schliemann and others, in which timber architecture was indisputably proved.) Letronne expressed the opinion "that the appearance of the Egyptian temples, entirely covered with painted bas-reliefs, must necessarily have influenced the taste of the

taste of the Greeks.

Raoul-Rochette denied all Egyptian influence but argued for Phoenecian influence; yet we know that although the Pheonecians diseminated art forms and exerted an incalculable influence on European architecture, we have no reason to believe that they had any ideas of their own worth transferring. Other persons have hinted that the Hittites, whose art was derived from that of Babylonia and Assyria, although it flourished long before the masterpieces of Mesopotamian art exerted an influence on the beginnings of Grecian art. This theory does not seem unreasonable since Phrigia and Lydia derived their art from these Hittites and may thus have transmitted it to Greece; but all that we know of Hittite art shows it to be detached in its development from the very earliest forms of primitive art in Greece. (Perrot & Chipiez, Art in Primitive Greece, Vol.2) Crude and undeveloped though the art of the Hittites might be, and so far removed from the historical styles, yet in its spirituality it may be more nearly akin to Grecian art than to that of any other nation. But of Hittite polychromy, we have no remains. If, as Choisy states, the Hittites carried Assyrian art to the coast of Asia Minor, they doubtless carried thither some ideas of color derived from the same source.

It is not unlikely that woven and embroidered textiles brought to Greece from Asiatic artisans by Phoenecians may have suggested the system of mural painting.

When Persia and Greece were brought into contact, Greece had far more to teach than to learn; but in the Alexandrian period the revival of rich coverings (such as bronze covered columns), the use of enamels, inlay and natural polychromy, which , although it had

flourished in the Mycenean period, had lain dormant so long, that it must have been forgotten, certainly resulted from Asiatic influences. (Semper, Der Stil, Vol.1, sec.81)

The theory of the derivation of the art of classic Greece from the Mycenean period, ably set forth by Perrot and Chipiez, seems to be the most probable solution. Excavations betray no sudden gap between the characteristic forms of the Mycenean , or most ancient period, and that of the early Grecian. It is true, that Mycenean art had passed its apogee and had passed into decadence long before the Dorian invasion swept over the country, but the art gradually evolved from the chaos seems rather to have been a renaissance and an attempt to shake off Asiatic influence, than an art derived from a foreign land. "If there was foreign influence, it could scarcely have come from Egypt, as the architecture of Egypt and Greece have a different point of departure, they were not affected by the same needs or the same thoughts. The budding forth of the early Hellenic genius was in all probability helped by the models which came to them from Egypt and Phoenecia. Who doubts that their advance was hastened by these suggestions! Their art, however, was assuredly derived from an inner consciousness; for in despite of strange forms and a somewhat barbaric display of magnificence, it may be considered as the first chapter or rather the preface of classic Grecian art." (Perrot & Chipiez, Art in Primitive Greece, Vol.2 p.486)

SECTION IV

General Influences and Considerations

A. Climate

The theory of climatic influence on the development of the polychrome system in Greece was worn thread bare by early winters. Goethe, one of the first to accept the views of Hittorff and to proclaim that the architects, who had found traces of colors on the mouldings of Greek buildings, were not deceiving themselves and others, attributed it to geographical conditions. He perceived that delicate shades of differences in colors are imperceptible to an eye blinded by the southern sun; it sees nothing but the simplest strongest and frankest color notes, to the exclusion of all the half tints. (Perrot & Chipiez, Art in Egypt, Vol. I, p. 121.)

The poets sang of the beautifully clear skies and the brilliant vegetation of their beloved country, but, though the atmosphere of Greece is undoubtedly more transparent than that of our smoky cities, we must make allowance for poetic license and patriotic sentiment. Hesiod, in writing of a certain part of Greece said: " where the winter is bad, and the summer also is evil, and nothing is good." We know that the Greece of today is not remarkable for its luxuriant vegetation, and in fact, the reverse is more nearly true. The coloring of the architecture may better be said to have been adopted to satisfy the hungry longings for colors that were lacking in the landscape, rather than to bring their buildings into harmony with the surrounding vegetation.

Durm asserts that "the climate does not absolutely control the artistic form of the architectural style", and points out that the Gothic architecture of the North is quite unsuited to the

climatic conditions.

It may be very well for the inhabitants of northern Europe to be impressed by the vertical rays of the sun and the need of color to properly mark the forms made indistinct by the bright light, but the sun shines no more vertically on Grecian soil than on our own District of Columbia.

Doubtless, as we have already remarked, the brilliant direct sunlight and the transparent atmosphere of Egypt may have had some influence on the extensive application of color to the monuments there. The converse theory might be applied to Greece,- that the system of polychromy was more restricted than that of Egypt, because the more northern climate did not demand surfaces so brilliantly and entirely covered. All persons, who have visited Greece, seem to be of opinion that the glare of sunlight on the pure white marble must have been very unpleasant, and that the ancient Greeks doubtless took some method of softening this glare.

B. Religion

The elasticity of the religious system of the Greeks did not permit so complete a stereotyping of forms and colors, as did those of the Egyptians. We cannot conceive of Greeks making their art subservient to anything but its own high aim; but it has been argued by those who opposed the polychrome system, that the painting of architecture was only a practice controlled by the priesthood and handed down as a relic of barbarism.

Yet the Grecian religion was of sufficient importance to demand the highest and best that art could produce. The desire for the favor of the gods was an incentive to improve the quality

of art to its very highest degree and no pains were spared to attain this end.

The rank of the various deities differed somewhat; there was a first order to which Zeus belonged, a second order, then the demi-gods and the heroes. Naturally, the temples dedicated to the first order of gods would differ in richness from those dedicated to the demi-gods or heroes. This difference was sometimes marked by size. The Greeks made no distinction, as we do, in the rank of their orders,- Doric, Ionic and Corinthian, these being used with equal dignity, the severe Doric more commonly employed because more in accordance with Grecian tastes. The greater or lesser importance of the temple was therefore marked principally by the amount of color decorations and the richness of the votive offerings. By the proper application of color, they could make the widest variations in the importance of the temples.

C. Natural Temperament of the Greeks

The naturally joyous temperament of the Greeks and their boudnless capacity for pure pleasure doubtless found expression in the love of color.

D. Materials

We have already mentioned the now accepted fact that the early buildings of Greece were of wood. The use of paint on wood as a preservative would have been very natural. Terra cotta was a very ancient traditional covering for wood, and is continued to be used even in the very highest period of architecture. (See Section on Architectural terra cottas.) Both the external wooden timbers and internal wooden ceilings of the archaic temples were entirely covered by richly ornamented terra cotta plates fastened

by bronze nails. (Semper Der Stil, Vol. I, Sec. 80.)

Stucco was one of the technical traditions transmitted to all the people of the ancient world, older than terra cotta as a covering. (Same reference as above.) The masonry walls were of shelly limestone or tufa covered with stucco, which produced a monotonous surface naturally requiring some colored decorations. Or the stucco surface may have been used because it formed an admirable ground for painting. "It is beyond a doubt that painting was at first applied without any intermediary on the stone or marble, which gave rise to the invention of stucco. It was to substitute for the harshness and porosity of the stone, as well as the joints, a surface unified and more fit for the perfection of drawing and the solidity of the colors, also to obviate the hardness of the marble, incompatible with the adhesion of paintings, as strong and as durable as the stucco permitted, and also to conceal the traces of the numerous blocks of which the walls were built, that this coat was preferred, and that it covered also the white stone of Paros and Pentelicos, as well as the black, gray or yellow stone of Eleusis and elsewhere". (Hittorff, Architecture Polychrome chez les Grecs, p. 194.)

Not only was stucco used for wall coverings but in the early period even for the coating of roof tiles. All the architectural members, even to the sculptures, were covered by stucco of varying thickness in the archaic period. Low reliefs were carved entirely in the stucco, and the final forms of stone details were expressed in the plastic material: the stone would be carved roughly, merely blocked out in some cases, and the refinements completed in the manipulation of the stucco coating.

The stucco used by the Greek builders was not the fragile substance that we are accustomed to associate with the name, but it was very hard and of exceedingly fine texture. The principal ingredient was powdered marble, mixed with a gluten, sometimes with thick milk. (The Builder, 1844). The surface was capable of taking a very high finish and served as a most admirable ground for paintings. The thickness of the coat varied considerable from an appreciable one to a mere film of a single millimeter. The surface of the marble was frequently scratched in order that the stucco might adhere more firmly: although the coating has disappeared in many instances, it can be proved by this scratched surface.

The use of marble as a building material was not common until the mature period of art, so that it is folly to insist that stucco was used as a substitute for marble, since it antedated marble by many centuries. It is most natural for us to conclude that white marble was used because of its beauty, but Pliny states that men first chose white marble not for its beauty but for its hardness. Marble was at first coated with a thin film of stucco but the builders soon realized that this was unnecessary and that painting in distemper or encaustic, but not fresco, could be applied directly to the marble surface. It would thus seem that the reverse of Kugler's theory was true, and that instead of the stucco being used to imitate marble, the marble was left uncoated because it looked like stucco and served practically for the same purpose.

The exact influence which the introduction of white marble as a building material exerted on the polychrome system, is difficult to determine. We know from the actual remains, that marble was often painted in solid colors and in various tones. Semper

even asserts (Der Stil, Vol. I, Sec. 80), that the transition from oligochromy (the use of a few colors) to actual polychromy (the use of many colors) did not occur until the perfected period of architecture. We know that the extensive use of polychromy in architecture finally waned, which some persons have attributed to a growing appreciation of the natural beauty of materials, but it might also be attributed to the degeneration of taste, that showed itself in all phases of art. It is quite impossible for us to judge which would have been the more beautiful: the pure white surface of the marble untouched by any artificial treatment, or the surface which was softened and toned down by some transparent tint. The weight of opinion seems to prefer the latter.

The Greeks laid a great deal of stress, more than we can appreciate, on the intrinsic value of a material, even though it was to be concealed: for example, the gold used on the chryselephantine statues was often covered with paint or enamel.

Frequently several materials were used on the exterior of the same building, as on the Temple at Egina, whose walls and columns were of coarse stone coated with stucco, but crowned by a cornice and roof of white marble; and the Temple at Delphi, whose facade only was executed in Parian marble. A harmonizing agent must have been employed in buildings of various materials and this agency was color.

The extensive use of colored materials was not popular in the best period of Grecian architecture. The colored marbles used in the Mycenean period, also the use of bronze coverings for columns, and glass, seem to have been abandoned, at least until the Alexandrian period. But the gleam of gold and the richness of

bronze for sculptures and the accessories of architecture remained in favor. It was in sculpture, that the highest attainment occurred in the artistic use of colored materials. The chryselephantine statues with their contrasts of ivory and gold and flashing gems were the triumph of the Greek sculptors' art. (See Section on Sculpture).

In the interior of the Erectheum were found some green marble columns but their exact purpose is unknown. The frieze of this temple was of dark Eleusinian marble with inlaid relief figures in white marble. Colored stones or glass were probably used in the interlaced rounds of the Ionic capitals, and the eyes of the volutes were doubtless marked by colored inlays like the custom in Mycenean art. Beyond this, there seems to have been very little use of colored materials until the late period of Hellenic art, when pure Grecian taste became corrupted with foreign influences. Then enamels were introduced and mosaics, which had hitherto played but a very small part in Hellenic architecture,- the mosaic pavements at Olympia being a rare case,- were then used extensively for floors and wall panels.

SECTION V

The Painting of Architectural Members

Our knowledge of the extent of painting applied to the architectural members of Grecian buildings is confined principally to the proofs of the colors that were actually found on the remains, or to the deductions derived from the condition of the surfaces, from which the paint has disappeared. In many cases, the colors vanished almost immediately after exposure to the atmosphere, so that we must depend principally on the notes made at the time of the excavations. On the buildings that have remained in place, color has been proved by carefully removing the crust that long centuries of weathering have formed there. Also, in some of the crevices and the more sheltered parts a small quantity of color may be found. The exact extent of the application of color must be more or less conjectural, because in nearly all cases only very small areas of color are found. According to the location of the color, or by analogous elsewhere, it is sometimes possible to determine approximately the amount of that color that had been there originally.

The mention of painted architecture in ancient literature is very infrequent, and once this was considered by some as evidence that it did not exist. Modern research has proved the falsity of this conjecture, and we may attribute the silence of the authors on this question to the fact that they were so generally accustomed to buildings decorated by paintings, that it was not necessary to mention such a common fact. Herodotus made no mention of colored sculptures in Egypt and it was doubtless because he was not impressed by them, since he was accustomed to seeing them at home

Pausanias mentions the Red Tribunal and the Green Tribunal which took their names from their colors and still retain them.

This particular passage was one concerning which the opponents and adherents of Grecian polychromy argued very learnedly, but they reached no definite conclusions. Some persons maintained that this was evidence that these buildings were painted in a solid color; others accounted for the colors on the the posts set outside the doors as the origin of the names.

The well known passage from Vitruvius (Book 7) proves to us the antiquity of the custom of painting the triglyphs blue. "The ceiling beams were laid in such a manner that their ends projected beyond the external face of the wall; they cut off at the wall plane the projecting portion, and applied to the ends of these beams some boards in the form of triglyphs, which they covered with blue wax."

Pliny speaks of the Temple of Minerva at Elis as having a coating of stucco dissolved in milk and saffron.

Some broken and incomplete slabs of Pentelican marble were found in 1836 in the right wing of the Propylaea, Athens, on which were engraved accounts for the work and completion and decoration. "To those that built the scaffolds for the painting of the lower part under the roofs, to Manis from Kollytos 4 oboli; to the painters , ... to him that painted the cymatium on the inner architrave 5 oboli per foot; 166 leaves of gold were purchased for the gilding of the shells, etc." In the same year were found many fragments of the friezes and main cornices painted in colors, which had retained in the earth a remarkable freshness, all this lending greater importance to the account slabs. (Durm, Baukunst der Griechen, chap. 6)

We shall now consider the actual proofs of color on architectural members that have been observed in modern times.

Early Temples

The tufa columns of the Temple at Corinth (650-600 B.C.) have a coating of red stucco.

There is red on some well preserved stucco coatings of ancient fragments of tufa columns found near the entrance to the Acropolis, which belonged to an ancient temple there. (Semper, Der Stil, Vol.1, sec. 80).

Temple of Jupiter at Egina

(Doric, archaic style of the 6th cent.B.C.)

In 1811 Cockerell investigated this temple and made notes of colors he observed there. The columns and the entablature were covered with a fine coating of marble dust and pounded stalictite, having an effect of great brilliancy and lustre. There were no traces of color on the columns or steps, and no part of the architrave was colored except the taenia under the triglyphs, which was red. The triglyphs and background of the tympanum were blue; the beak moulding had the well known leaf ornament, and within the portico there was a facia band over the frieze, of great lustre, with an enrichment highly archaic in character , colored blue on a strong red ground, well preserved in several parts. (The Builder, 1852, p. 114)

In an account of the sculpture at Egina, by Wagner and Schelling (1817), we read : "The cella of the temple was cinnabar red, as we can suppose from tha fragments; but in the interior of the cella the walls were covered with a fine coat of lime which was polished and also painted red." (Hittorff, Architecture Polychrome, p. 148)

Another archaeologist observed that the tympanum was azure blue; the raking cornice of the entire entablature, which showed a general tone of yellow, was richly painted.

"We have noticed that the columns of the Temple of Jupiter at Egina are covered with a yellow stucco." (E.Burnouf, Revue des Deux Mondes, Dec.,1847)

Furtwaengler found red on the under sides of the inclined cornices above the heads of the statues of the pediment. The marble supports of the figures were red. The rear wall of the tympanum was blue, and the large cyma between it and the cornice was red and blue. He found only red and blue on the fragments from Egina, although he does not insist that other colors were not used, but these two must have predominated. He could prove no traces of gold .

Garnier , who attempted a restoration of this temple in 1853, found on many parts of the columns some traces of a yellowish stucco, the color of which seemed not only to be applied on the stucco, but to be actually incorporated therewith. On the capitals of the columns were also numerous remains of very rich yellow stucco. This tone is found only on the stucco of the capitals, and all the parts, wherever their exposure, visible or concealed, have this tint. It was not the primitive color which would undergo an alteration; in various other painted ornaments of the temple some red traces have in different places assumed tones almost identical with those of the capitals. This tone might be produced by an oxidized gilding. He found no traces of ornament on the stucco of the capitals.

Numerous traces of red were found on the bits of architrave

lying on the ground, especially on those nearly buried, where the stucco is still on large surfaces. It is a bright red, having the appearance of vermillion and carmine mixed and a little browned by time; it has become incorporated with the stucco.

The architrave band of the pronaos was painted red, and on this were still some traces of small blue reversed palmettes.

Wagner noted that the under side of the architraves was ornamented with simple meanders.

On the complete and well preserved fragments of the lateral cornices, which are of a fine and hard grained limestone, there remains no trace of stucco; the ornamentation and the colors were applied on the stone itself.

The foliage ornament, painted green and red on the crow's beak moulding, has been recognized on a fragment of the raking cornice; the red and green have penetrated into the stone. The lines between the leaves are distinguished only by scratches in the surface, the color has disappeared from them.

Blouet mentioms a meander ornament on the facia , but Garnier found only the red ground remaining, very bright, and penetrating into the stone.

Some blue was found on the under side of one of the mutules. The guttae are of a bright yellow color, a little deeper than that of the columns. The fillet underneath the mutules is red.

On nearly all the fragments of the lower taenia, of the intervals between the mutules, and on the lower projection of the cornice, is still to be seen a red like that of the corona.

The raking cornice is of the same stone used for the level cornice, only the cymatium being of marble. The crow's beak mould-

ing is like that of the level cornice. On the corona, the color of the ground is no longer red but green; it has also penetrated into the stone. The ornamentation of the cymas underneath exist in part; they are composed of a species of foliage of two different widths; the widest is green with a red point, the narrowest red with a blue point.

Garnier found that the inner face of the architrave was decorated in red.

The columns and capitals of the pronaos show the same peculiarities of color as those of the facades. The color of the architrave is red.

The red color of the wall at the end of the cell is found on the lowest course at the right side of the entrance door; it is deeper than that on the other parts.

The blue of the lower columns is preserved on the different shafts in small particles. On the upper columns Garnier found traces of red but only on the arrises, and he concludes that only this part of the columns was colored.

On the fragments of the interior cornice were remains of green and blue ground colors; a cavetto had some traces of deep red with engraved vertical lines.

Garnier collected a number of roof tiles covered with of a reddish color, more or less brilliant, according to its preservation; others are of a yellowish color, like shining gold. On the marble tiles the color was lacking or had been effaced. (Hittorff & Zanth, Architecture Antique de la Sicile, p. 585, ff.)

(For colored restorations see Furtwaengler's Aegina, Pls. 61, 105, 106)

The Larger Temple at Rhamnus

(Doric, 450 B. C.)

Here are very rich vestiges of colored decoration. There are broad bands along the cornice of the cella wall in the peristyle, the lowest of which was decorated by a meander, the upper one with a palm leaf ornament, over each of these being a bird's beak moulding with painted leaves. There are remains of color on the soffits of the ceiling, the ground of which seems to have been blue and the stars gold. The outlines of the leaf ornament were alsovisible on the capitals of the antae, which are exactly like those of the Parthenon.

The string courses of the pediment were continued along the sides of the temple and had likewise a colored decoration, which protected the marble from the influence of the air, so that it was slill seen in slight relief. (Transactions, Royal Institute of British Architects, Vol. 1, p. 89)

Temple of Aesculapius at Epidauros

(Doric, 370-375 B.C.)

The walls, columns and entablature of tufa were covered by a thin coat of fine white stucco, on this being placed the colors: a yellowish tone being probable for bases and capitals of the columns and for the plain parts of the walls; some reds and blues were placed on the entablature. It is on the under side of the cornice that the most numerous traces of this polychromy remain.

The mutules were painted blue and on this blue the guttae were contrasted in a light color, being kept in the white of the stucco or a tone of yellowish stone. The intervals between the mutules were ornamented by a beautiful palmette on a red ground.

The fillet above the triglyphs was a Greek red, and the ogee, which separates the fillet from the mutules, shows some remains of eggs and darts, also red. These drawings are all outlined on the stucco with a tool.

The terra cotta gutter shows yellow ornaments on a dark brown ground with some parts picked out in red. The marble gutter along the sides had been painted in encaustic with particular care; for they had required of Hectoridas, the sculptor, to furnish a model for the spouts of lion's heads, and they paid him 16 drachmes; it was according to this model, that the spouts were painted by a certain Protagoras, for a sum of several hundred drachmes, but the marble has retained none of these colors.

The metopes were not sculptured; they must have been painted; and in the "secos" shining with polished the brilliancy of gold was added to the joyous tones of red and blue. (Defrasse & Lechat, Epidaure, p. 57 and ff. See Plate IV for a colored restoration of the Tholos which corresponds in its polychromy to the Temple of Aesculapius.)

The Parthenon, Athens

(Doric, completed, 438 B.C.)

These facts were established by Paccard, who made colored drawings which he exhibited in Paris in 1847:

A light yellow on all the architectural parts, i. e., columns and entablatures on both the exterior and interior of the edifice.

All the walls of the pronaos, cella and opisthodomos were painted red.

Blue on the triglyphs and mutules, with red guttae.

Red grounds on the metopes of the friezes and the tympanum of the pediments.

Ornamentation of different colors on the mouldings, comprising the faces of the facias, the fillets, the great cyma; the heads of the lions had red mouths and blue eyes.

The decorations of the ceilings showed azure grounds in the caissons and golden stars.

The antefixae were left in the natural color of the white marble.

The antique paintings found on the Parthenon are in wax, according to an analysis made at Athens; they are always more than one half millimeter thick.

On the pediment of the west facade, the mouldings of the corona are enriched with an ornament on whose ground are some traces of red.

On the ogee of the facia is found an egg ornament, the eggs alternately red and blue.

Red was found on a piece of the tympanum of the east pediment buried in the rubbish.

The crown moulding of the horizontal cornice differs from that of the pediment. The corona and the fillet underneath are red; the principal and lateral faces are blue, the soffits red, the guttae gilded, and the underside red with gold lines; the background of the mutules is ornamented with a green meander on a red ground.

Some ornament was found on the band of the architrave and on the under surface of the guttae, and also on the soffits between

the mutules at the four corners.

There are still some colors and ornaments on the capitals of the northwest antae. The eggs, probably gilded, are set on a green ground. The bird's beak underneath the dripstone of the capital was decorated by an ornament like that found on the moulding, that crowns the cornice of the large order: it is green and red.

There are some ornaments and colors on the cornice of the internal entablature of the great order,and in the ceiling panels.

The colors observed on the Parthenon are: 1st, red of two kinds, red lead and vermillion; 2nd, ultramarine blue; 3rd, two kinds of green; 4th, yellow;5th, black in small quantity, for the lines which set off the sculptured ornaments.

On some drums of the columns of the west facade, which were lying on the ground, was found a pale colored coating about one millimeter thick. On the capital of the column at the northeast corner was found the same coating, which is easily distinguished from the local color of the building.

The metopes show a number of holes intended for the fastening of accessories or emblems, which were probably of gilded bronze. On a metope of the east facade, the bronze is still in place.

The metopes which have been preserved are too much mutilated to prove any traces of color. The ground of the Panathenaic frieze shows traces of red. The sculptures also show some traces of color. (See Section VIII)

Hermann made observations relating to the Parthenon, that accord in general with those of Paccard given above.

Beulé declares that he found some traces of blue on the tympanum of the western pediment, and that the mouldings enclosing it show red in contrast.

Moneghetti, and others, observed that the crust of a golden yellow color on the southern facade, generally attributed to the sun, was also found on the north side and was of the same brilliancy.

It is said that by a favorable reflection of the sunlight, traces of gilding may be seen on the mutules, and this observation is taken as evidence that the colors were merely the ground for the gilding. (Antiquities of Athens, new edition)

(For most of the above we are indebted to Hittorff & Zanth's Architecture Antique de la Sicile, Book IX, chap. 2)

There are remains of Mediaeval paintings at the Parthenon, and therefore some persons have objected to the coloring of the Parthenon during the antique period, assigning all remains of color to the Mediaeval period; but Penrose, who was very conservative on the subject, declared that there were also remains of painting coëval with the building of the temple.

He has recorded his observations of color on the Parthenon, which practically accord with those above. He noted that the cymatium at the top of the cornice has a honeysuckle motive, the ornament being clearly incised in outline.

The mutules showed a deep blue on the edges and soffits; the triglyphs and their caps retained some traces of blue. (Penrose, Principles of Athenian Architecture, pp. 55,56)

Pennethorne made similar, though not so extensive, observations on the color of the Parthenon. He also mentions that on the fragments of the entablature of the earlier Parthenon (B.C. 800), destroyed by Xerxes and excavated in 1836, were found some colors in excellent preservation,-- green, blue, red, etc, on the different parts of the frieze and cornice. (Pennethorne, Geometry and Optics of the Ancients, p. 197)

The Propylaea of the Acropolis, Athens

(Part Doric, Part Ionic,- 437-432 B.C.)

On the inner entablature ,a broad facia with a meander, surmounted by a bird's beak moulding and resting upon an ogee, both painted with different leaves; the bird's beak member in the capitals of the antis was also painted with leaves. There are traces of a dark rich red. The corona moulding of the pediments is decorated with eggs and darts. On the Ionic capitals of the internal row of columns, the cushions, as seen from the sides, were painted with scales and tendrils.

On the north side of the Propylaea, the different members are painted like those on the interior of the principal building. (Transactions, R.I.B.A., Vol.I, p.87)

Penrose noted that on the eastern portico the bird's beak moulding of the coronas, both of the raking and horizontal cornices, had a pattern of Egyptian character, - vertical leaves- , alternating red and blue. On the vertical face under the projection of the cornice, faint traces of red were visible. The soffit between the mutules appeared to be red . The sides, soffit and front of the mutules showed distinct traces of blue; the guttae exhibited no colors except on the under side, where a circular ring was traced, formerly distinguished by gold or color.

On the abacus above the Ionic capital had been a painted ornament of eggs. Color had also been used on the eggs under the abacus of the capital, as merely the outlines were indicated.

The capital of the antae of the smaller order, on the upper member showed deep blue leaves with white veins on a white ground, gold edges and red darts. The principal moulding had alternate

leaves, red and blue with gold. The cavetto beneath was of a brilliant green, with two gold bands below it. (Penrose, Principles of Athenian Architecture, P. 60 and Plate XXVI)

In the ceiling of the central portico, the blue ground of the coffers was very positive in some places; there was also a narrow line of bright green on teh margin of the soffits. The ovolo mouldings had distinct traces of the egg and dart ornament on a blue ground. There were traces of blue on the under side of the divisions between the coffers. The narrow bead moulding was marked by a blue line on one side and green on the other. (Penrose, p.59, Pl. XXIV)

On the central portico, Pennethorne discovered that the channels of the triglyphs were light blue, the taenia at the top of the architrave was red, the regulas blue, and the drops were blue with gilt ends. The band above the triglyphs was deep blue, red above; the leaf moulding was red, blue and yellow ,just below the mutules; the mutules were blue, the drops uncolored on the ends, the soffit back of the mutules was red with yellow or gilded palmette ornament between the mutules. The moulding above the facia of the cornice had alternate red and blue leaves. The crown moulding had light yellow eggs on a blue ground with red darts between. (Pennethorne, Geometry and Optics of the Ancients, Plate XIII)

Temple of Theseus, Athens

(Doric, Completed about 469 B.C.)

The entablature of the peristyle has colors on the figures is painted blue. Some painted meanders on the entablature seem to have been red An ovolo just under the cornice of the roof

has painted eggs. On the ground of these soffits is a dark color with lighter stars.Red, blue,green and gilding (latter doubtful) alternate in these decorations. Under the neck of one the antae of the porticoes, Semper found some blue paint. The mutules on the external entablature, except the drops, seem to have been blue, as well as the ground of the metopes on the external frieze. (Transactions R.I.B.A.Vol.I, P.85)

"The ground of the caissons of the ceilings was blue with a gilt star. All the mouldings and small facias within the colonnades were painted with an ornament. . . . A thin coating of some substance is on all the columns and on the face of the interior architraves and friezes; probably the whole edifice was covered with a stucco or a thin coat of paint. The soffits of the mutules were blue and I have some of its color. All the facias of the external architrave and the bed of the cornice were decorated with painting, but the weather has acted upon it to such a degree as to erase the coating in great part; still , however,it is distinguishable, yet no form can be traced." (From a memorandum made by T.L.Donaldson, 1820)

Stuart noted that the entire edifice was covered by a deep, rich ochreous tinge.

"All the sculptures of the Theseum , as well of the metopes as of the friezes,were painted, and still preserve some remains of the colors. Vestiges of bronze and golden-colored arms, of a blue sky , and of blue green and red draperies are still very apparent." (Col. Leake, Topography of Athens, p.511)

Semper made the following observations on this temple:

A careful examination of the external surface shows some very visible traces of a painting ,whose material substance is best

preserved on the south side of the temple. By carefully removing the crust here and there in the sheltered parts and in the crevices, he found two kinds of red, - on the columns, architraves, and larger surfaces generally, a warm brick red; on the ornaments, a bright vermillion red ; two kinds of blue, - sky blue on the large surfaces; a much deeper blue on the ornaments; etc.

In the sheltered places is a kind of a yellow vitrification, or enamel, which Semper believes to have been there originally.

On the interior of the cella, starting from the great base and six courses high, there must have been a thicker coat, as the remains of stucco, preserved in the lines cut into the marble surface, would seem to prove. We cannot attribute to the Christians this cutting so perfectly done, because if they had found the walls smooth they would have executed their paintings directly on the walls as they did at the Parthenon. (These paintings show, in the manner in which they are executed, in the order and severity of the compositions as well as in the details, a tradition of the ancient Hellenic paintings.)

Some observations established by Hermann are as follows:

The ground of the tympanum was a deep brown red.

The crow's beak moulding above the facias of the raking cornice of the pediment and of the other horizontal cornices was decorated by leaves, alternating red and blue, with borders of blue and red between two white lines; the intervals between the large leaves are green.

The mutules are blue; the intervals and the band above are deep brown red, like the tympanum; the drops also are red, but of a lighter tone approaching vermillion.

The triglyphs are blue as well as the taenia above the guttae, which are red like those of the mutules.

There is no clear proof of any ornament on the echinus and abacus of the capitals, either of the drawing or the color.

On the ceilings of the portico, the caissons are azure blue and are surrounded by lines of vermillion red with a six pointed star, also red bordered with gold. The beams dividing the caissons are decorated by a leaf ornament, egg and dart mouldings, etc., and are colored with dark green, light red, white, yellow and blue.

The caissons of the portico of the ceiling are similiarly decorated.

The ground of the frieze sculptured in high relief, is blue; the ledge on which the sculptures rest is red, as well as the projection of the architrave.

The band of the architrave is ornamented by a simple red fret on a white ground.

The internal face of the architrave was not colored, or else it received a pale red tone. (Schaubert observed that it showed traces of a beautiful red color.)

The capital of the antae is composed: of a quarter round with green eggs, outlines and sides red , darts blue; of a white band whose projection over the moulding beneath is red; of a crow's bill moulding with large leaves, red and blue like those of the cornice; of a second band with leaves like those above, green with red and blue outlines; of an annular band with red pearls outlined with white on a green ground; of a red line; then two white spaces whose separation is indicated by the red projection of the upper one. (Hermann, Bemerkungen ueber die Antiken Dekorazions Maleri au der Templen zu Athen)

The Erectheum, Athens

(Ionic, 439-400 B.C.)

The folds of the garments of the caryatid (now in the British Museum) show distinct vestiges of blue, and doubtless the entire garments were painted with this color. Such a mass of color would call for a corresponding polychromy of the surrounding members , but we have little data regarding it.

Tétaz made a restoration of this building in 1847, according to the facts of coloration, which he had observed. The capitals of the columns of the northern portico showed red on the fillets of the volutes; on the interior of the volutes and above the torus, which was blue, ran two spiral ornaments of gilded bronze, the fastenings of which are still visible. The torus above the eggs was ornamented by interlacings, in the eyes of which had been incrusted enamels of various colors. The ground of the eggs was doubtless blue, as on the Ionic capital from the Propylaea, and the eggs red or gilded. The row of palmettes, which terminates the base of the columns does not retain any trace of color, but some years ago, there was still found on those of the antae the dark red and light yellow tones of the ornament with some details in green and brown.

The eaves were of smooth contour and had painted ornaments; a fragment, which seemed to be a part of the eastern portico, still preserves the complete design traced with a point.

The frieze, of black Eleusinian marble (now a bluish slate color) with figures in white marble, must have had some color applied to it, but we have no proofs of this. The pediments do not seem to have had any colors and we may only surmise that the ground was possibly relieved by painted ornaments.

The caissons of the northern and southern porticoes have preserved on their background mouldings the drawing incised with a point; their ground is blue and the eggs are a blackish color , which is a decomposed red. At the northern portico, the smooth field, which separates and surrounds the caissons, is ornamented by a double meander, - red on a blue ground. At the great door of the North, the knobs of the rosettes on the frame are sculptured in marble on the lintel but they are in bronze on the sides. It is possible that all the knobs were gilded .

It is possible that there was more color on the various members but this is not proved.

The light yellow color of the entire surfaces, according to Tétaz, may have been a transparent tint to harmonize the masses with the brilliant red, blue, and green of the decorations, which received a thicker coat in encaustic.

Hermann also made some observations on the coloring of the Erectheum which accord with those of Tetáz.

Olympia

Temple of Zeus

(Perfected Doric, 470-457 B.C)

The entablatures of the Doric buildings of Olympia, without exceptoin, were painted with animated colors. (See Plate 112, Curtius & Adler's Olympia)

At the Temple of Zeus, red was found on the annulets of the Doric capitals of the portico, but the columns otherwise showed no traces of paintings. Red was determined on the upper band of the architrave, on the band beneath the mutules of the cornice ,and on

the spaces between the mutules. Traces of blue were discovered on the regulas of the architrave,on the triglyphs, and on the mutules of the main cornice. Some ornaments likewise remain, recurved leaves of the ordinary Doric form on the cyma of the cornice, and a richer painting on the cyma. (See Plates 13, 14 and 16, Curtius & Adler's Olympia, also p. 17, Vol.2 text)

Laloux, who made a restoration of Olympia gives the following observations in regard to the Temple of Zeus:

The columns were covered by a fine marble dust stucco.

On the principal facades, the architrave was decorated by shields, relieved by painted ornaments. The frieze was ornamented by triglyphs in somber blue, but had no sculptured metopes.

On the floor, walls, and entablature of the external portico had once been a rich polychrome decoration, produced by mosaics paintings and ornaments of bronze.

We also find many paintings. On the larger surfaces, such as triglyphs, metopes and the soffit of the cornice, were applied thick coatings of color matter which united with the stone or stucco. Again ,we see a light decoration on a white ground: the presence of the painting is proved, on the cyma by a difference in tint of the places covered by it. Finally, we can still distinguish the lines scratched with a point by the workmen before applying color to the ornaments. At the Temple of Zeus, as in all Doric temples, the triglyphs and mutules were covered with a blue coat; the metopes showed a ground of colored stucco covered with ornaments.

The architrave is left white,as at the Parthenon; the coloring is obtained by the application of gilded shields, and we are permitted to suppose, from analogy with an architrave to be seen

at the Museum in Olympia, the shields of Mummius were surrounded by meander ornaments painted on a white ground. The cymatium was covered with palmettes, but it is impossible to determine the color of it. The lions' heads alone show some undoubted touches of color on the muzzle, the eyes and the tongue; the rest was white. On the cornice only the upper mouldings were painted.

The echinus of the capitals shows some undoubted color ornaments, - palmettes or lotus buds, as at Paestum. The sculptures of the pediments and of the metopes of the inner frieze remain mostly white, but they were touched up with applications of metal, and they are detached on a colored ground, - blue on the pediments, red on the metopes.

The metopes of the frieze are decorated with emblems and symbols enlivened with inscriptions and enclosed in ornamented circles. One of the eastern metopes bears traces of a circle 4.59 ft. in diameter. We think that this circle was made to guide the painting of the metope. In the blue tympanum of the pediment, bordered by a cyma with painted palmettes, are detached groups of white sculptures enhanced by applications of metal. At the extremities of the raking cornices are outlined some gilded vases, while at the summit of the pediment, on a pedestal with a golden shield, was the wingless Victory enclosed by the azure sky.

In the interior of the cella was the statue of Zeus, described by pausanias, and the walls surrounding it had once been decorated by paintings on a blue ground by Panaenos.

According to Graef (See Curtius & Adler, Olympia, Vol.2, p. 183),the numerous capitals from the Temple of Zeus, as well as those from the Leonidaion and the Palestra, found in an approximately

uninjured condition, showed no vestiges of either color or drawing on the abacus or echinus.

(For drawings of restorations with color indicated only in tone, see plates opposite pages 72 -73, Laloux & Monceaux, Restauration d'Olympie.

For photographs of the remains of the pronaos mosaics, both the border and the field, see Curtius & Adler's Olympia, Plate 105).

The Leonidaion, Olympia

(External colonnades, Ionic; Internal Doric)

The external cymatium is of painted terra cotta; the antefixae are formed of double palmettes and the spouts are lions' heads; the whole is covered by rich colors, in which reddish brown predominates.

The triglyphs of the inner court are dark blue; the bands are red; the capitals and the metopes must have been left white. (Laloux & Monceaux, p.142)

Bormann noted that the colors were well preserved under a coat of Roman stucco. The Doric foliage on the upper cymatium of the cornice is alternately red and blue, with white outlines. The narrow band above the mutules was red, the spaces between the mutules were not painted, as is the rule. The Lesbian cyma beneath had foliage, half blue half yellow, with black shaded edges, producing an effect of relief; then a red fret on a blue ground; on the lower cyma were blue leaves with white edges on a red ground. On the under surface of the cornice at the angles there no longer appeared recognizable traces of ornament on a red ground.

Also on the cyma of the inside of the entablature was still

to be recognized the coloring of the foliage ornamentation. No traces of color were found on the metopes or the capitals, but the mutules and triglyphs show a deep bluish black.

The reliefs on the terra cottas were not painted, except that the mouths of the lions were red, but the cyma exhibited black leaves outlined in white on a violet-red ground, the facia of the cornice having a white fret pattern on a black ground. (Curtius & Adler, Vol.2 text, p. 88)

The South-east Building, Olympia

According to Doerpfeld, the painting of the architectural members was well preserved, and the colors were protected under a coating of plaster in the Roman period, being quite fresh when uncovered

On the inclined pediment of the cornice the lower cyma was painted with blue leaves and red spikes on a yellow ground; the small cove above the cyma shows a variegated band.

The mutules of the horizontal cornice were dark blue, nearly black, and the intervals red; the cyma beneath them still has a row of leaves painted red, yellow , black, and probably also blue, and the band beneath them has a fret of the same colors.

The triglyphs were dark blue, while the metopes were coated only with white stucco without painting.

The relief at the top of the architrave shows evident vestiges of red.

A fragment of the antae capital exhibited remains of red and blue leaves on its cyma, and the upper cove were traces of small palm leaves, and an ogee with painted leaves in bright colors on a

dark ground.

The echinus and abacus of the capital and the shaft of the column had neither any color nor any ornaments, and the metopes were also left perfectly white. This important observation is justified nn all the buildings of Olympia. (Curtius & Adler's Olympia, Vol.2 text, p. 73)

The Palestra, Olympia

(Ionic and Doric)

This building also once shone with rich colored decoration but the ruins give only a partial idea of it. It was most distinct on the Ionic architectural members, but there scarcely anything could be recognized, except the drawing of the former painted decoration, which was scratched into the surface, and which had been better protected under a coating than the surrounding parts. Only slight traces of the colors themsalves could be found. The painting of the cyma of the abacus with Lesbian leaves was proved on some capitals. Red was found on the surface of the rings above the echinus, on the end of the baluster face, and on the rings enclosing it. That the shafts were also painted is not certain, but is probable. (See Plate 74, fig. 4, Curtius & Adler's Olympia, for the painting of the Ionic antae capital.) On the upper members of the antae capital were found only the drawing with traces of red as a ground color; but on the necking of the two pieces were observed undeniable remains of a brilliant deep blue ground, green in the scrolls and yellowish red in the flowers. The drawing of the latter is preserved in outlines sufficient to show that the treatment of the forms might be very free, in fact, naturalistic.

On the Doric capitals, although a great number of them were found uninjured, no vestiges of any drawing were found on the abacus or echinus. It is, therefore, certain that these members were not decorated, yet some remaining traces of red and yellow make it probable, that the columns were tinted in general or on certain parts. (P.Graef, p.120, vol.2 text of Curtius & Adler's Olympia)

The Heraion, Olympia

(Doric, 10th. cent. B.C.)

Nothing of the entablature of this building remains. The pediment was crowned by a curious acroteria in painted terra cotta, circular in shape except in the part hollowed out by the pediment apex. It is 7.35 ft. in diameter. In the decoration of this acroteria are mixed geometricla designs and lines, borrowed from the organic world. (Curtius & Adler, Olympia, Plate 115)

Temple Metroon, Olympia

Many parts of the architectural painting were preserved under the plaster of the Roman period. On the cymatium were leaves alternately red and blue. Light blue was found on the triglyphs , regulas of the architrave and the mutules of the cornice, with red on the upper band of the cornice. No traces of color or ornament were found on the metopes or capitals. The terra cotta cyma has its painting well preserved: the ornament is light with touches of violet-red on a dark ground. (Curtius & Adler's Olympia, Plate 121, fig. 3)

The Philippeion, Olympia

(Ionic)

This is an ashlared building of white marble, covered with stucco and painted. The external wall of the cell within the circular portico was painted like brickwork, - red with white joints as there are remains of a dark red coloring. Pausanias did not see an actual brick building but one skillfully painted. (Curtius & Adler, p. 132)

The Treasury of Gela, Olympia

(About 582 B. C.)

The entablature was decorated by curious terre cottas fastened to the stone by iron nails: they were the cymatiums of the eaves with holes for the rafters, the cymas extending up on the pediments, the facing of the larmiers ornamented by a double interlacing band with meander and beads. This decoration in painted terra cotta gave an original aspect to the Treasury of Gela. (Curtius & Adler, Olympia, Plate 116, fig. 2 and Plate 117)

The Treasury of Megara, Olympia

(Doric, 2nd half of 4th cent. B.C.)

The southern facade of this treasu ry was richly decorated. We observed there a frieze with triglyphs, a cymatium of terre cotta with heads of lions, palmettes and lolus flowers. Some curious sculptures were enclosed in the pediment, and numerous traces of color were observed there: red dominates in the figures which are detached on a blue ground. The whole is treated in a very archaic style. In the richness of the ex-votos and the decorations, none

of the treasuries of the Altis could vie with that of the Megarians. (Laloux & Monceaux, Restauration d'Olympia, p. 124)

Doerpfeld found red on the upper band of the architrave, and on the band beneath the mutules of the cornice, as well as on the intervals between them. Traces of dark blue were still plainly recognized on the triglyphs and mutules. There were painted leaves on the cymatium of the pediment cornice. On the metopes and capitals of the columns there remained no vestige of ornament. The cyma, drip tiles, and covering tiles retained their colors and patterns excellently. (Curtius & Adler, Olympia, Plate 119, figs. 4, 5)

Entrance Gate of the Stadion, Olympia

(Late Corinthian)

The entrance gate of the Stadion has preserved only the remains of color found on any Corinthian ruins at Olympia. On the under surface of the cornice and on the band beneath the dentils were found traces of red. The complete painting of the capital could be determined. (Curtius & Adler, Olympia, Plate 114) The astragal is red, the lower leaves green, the upper leaves yellow, all with red linings; the scrolls red with lines of yellow; the flowers yellow with red stamens; the fillet above the abacus is deep red. There were eight or ten coatings on this capital, white alternating with the colors. On one cobalt blue was used for the leaves. The upper three layers were white, - thus the coloring was omitted int he later period.

The Choragic Monument of Lysicrates, Athens

(Corinthian, 355 B.C.)

This monument likewise exhibits various remains of painting, particularly on the fillets of the cornice, the leaves of which were alternately colored in different greens and reds. (Transactions R.I.B.A., Vol. I, p.89)

Temple of Diana, Ephesus

(Ionic, 330, 320 B.C.)

In his archaeological explorations at Ephesus, Mr. Wood found traces of red and blue on many of the fragments of the sculptured drums, and one example on which gold had been used: this consisted of two astragals with a double strip of thin lead between them enclosing a strip of gold which had probably been turned down and formed a fillet between the astragals. (Proceedings R.I.B.A., 1873-75, p. 139)

Temple of Ceres, Paestum

(Doric)

Mauch was able, by a very favorable light, to observe that the cyma of the architrave was composed of a quarter round with sculptured eggs and other mouldings. The ground was painted in a very vivid red, and on the eggs themselves were traces of a light ochre color, but the outlines and darts were very much defaced, and he only supposes them to be black. Some traces of red and yellow and black were found on the walls of the cella, but it was impossible to determine the manner in which they were used. (Hittorff, Architecture Polychrome, p. 45)

The Basilica, Paestum

(Doric)

Hittorff and Zanth both confirmed the presence of red and blue in the ornaments on the stucco placed between the necking and the echinus of the capitals.

Sicily

For the observations on the color of the antique monuments of Sicily, we are principally indebted to Hittorff and Zanth (Architecture Antique de la Sicile, Book IX, Chapter 2) Serradifalco also devoted considerable attention to the same subject. (Antichita di Sicilia)

Temple S, Selinuntum

(Doric)

On the cornice was found a red fillet; a wide band of bright yellow on which flowers and corbels are set off in red, black and deep yellow, intertwined with red scrolls; above are two crow's beak mouldings with red and blue water leaves; these mouldings are separated by a black and yellow interlaced fret with yellow stars on dark red. Traces of a pale yellow polished stucco are distinguished on the walls and floors. (Architecture Antique de la Sicile, Plate 56, fig.1, also Architecture Polychrome, Plate 10, fig.1)

Temple C

(Doric)

On several places were remains of colored stucco, which covered the monument, as well as the traces of lines of the ornament which were engraved on the fine and compact stone of the mould-

ings, afterwards filled with color.

On the architrave, the drops and the tringle corresponding to the triglyphs were blue; the taenia above were yellow , between two narrow red fillets; the ground of the sculptured metopes was red; on the string course of the metopes, red frets are in relief on a red ground. (Architecture Antique de la Sicile, Plate 27, fig. 5, and Architecture Polychrome, Plate 8 fig. 4)

Temple of Empedocles, Selinuntum

(Doric Entablature, Ionic Columns)

Some traces of color besides the yellow of the stucco have been found on the architrave; some blue on the guttae, and the tringle under the taenia of the architrave, which is red; some traces of red on the ground of the metopes. 5he mutules and the guttae are blue; the fillet above the mutules is red. (Architecture Antique de la Sicile, Plate 19, fig. 18, and Architecture Polychrome, Plate 6, fig. 8)

Serradifalco recognized some traces of bright yellow colored stucco on the entablature and in the antae of this temple.

Temple R, Selinuntum

(Doric)

The same colors found by Hittorff on the entablature of the temple of Empedocles, apply also to this temple. Among the remains were some fragments of brown and yellow terra cotta. (Architecture Polychrome, Plate 6,fig. 16)

In 1824 there were still some vestiges of stucco on the floor of the posticum and the portico, which bore traces of several colors,

black and red on a general tone of yellow, like that of the columns an entablature. These stuccos were 5mm. thick. Serradifalco found some fragments of white stucco, which still retained three horizontal bands of red, white and azure, on many remains of the columns.

Serradifalco says in his work on the temples of Selinuntum: "On the Acropolis are many remains of column trunks coated with the finest white plaster. The listel of the architrave is red; the guttae, blue; the triglyphs blue on the face with black channels. The astragals of the capitals are red. There are mouldings of terra cotta of a yellowish color, frets and other ornaments painted in red and dark gray. The ground of the metopes is blue, according to the fragments, and there are traces of red and blue in the draperies. The capital of a triglyph was first painted red on the stone, afterwards coated with stucco and repainted red. The entire walls of one building were coated with very fine stucco of a pale yellowish color. Sunk lines are marked with a fine black line, so as to give more effect to the other mouldings." (The Builder, 1859, p. 58)

Temple of Jupiter, Agrigentum

(Doric, 480-440 B.C.)

This was an ashlared temple, the columns being built around a core, and the joints concealed under a coat of very fine stucco. Cockerell noted that the colossal sculptures were also covered with stucco, and Hittorff further noted that the nude parts were flesh colored and that some of the draperies still showed red. The pediments were also coated with a colored stucco of which there were numerous traces.

Temple of Castor and Pollux

On the wide yellow band of the cornice were red and blue flowers, connected with red scrolls; an ovolo with blue heart shaped leaves having veins and outlines of yellow and a red ground checkered with yellow lozenges; a small yellow band with a yellow fret interlacing with red rectangles with yellow centers. (Architecture Polychrome, Plate 21, fig. 6.)

The Museum, Syracuse

On the marble entablature of this building Hittorff confirmed a general yellow tone; on the ogee some blue heart shaped leaves veined with black with double outlines of yellow and blue, alternating with some other heart shaped leaves , which are yellow outlined with blue and marked in the middle with red; some red recesses between the mutules were whiter in some parts than the rest of the fragments; the larmier also was red; on the upper part of the corona and on the crow's beak, which separates it from the larger cavetto above, some yellow water leaves like those on the entablature, but outlined with blue, and some red ornaments like leaves on the convex part of the crow's beak. (Architecture Polychrome, Plate 9, figs. 1,2,3)

SECTION VI

Colors and Technical Considerations in Architectural Painting

"In general, the Greeks avoided the broken tones which nature had given to the marbles; they loved simplicity of effect, and sought in the pure opposition of the colors, the frankest contrasts". (Choisy, Histoire de L'Architecture, Vol. I, p. 293).

Red usually penetrated deeply into the surface and for that reason is usually better preserved than the other colors. It was nearly always a covering color and found manifold uses; probably in some cases it served only as an under color for gold. It varied from a dark brownish tone to one like vermillion.

Some red analized by Professor Landerer, of the University of Athens, appeared to be a mineral composed of iron, red earth and wax, mixed with some organic matter, either oil or wax. Another red contained natural cinnabar. Another chemist found that the red from Sicily is an iron oxide.

Semper says that red ochre was used for coloring stucco; dragon's blood called "indicium" was a transparent color used for tinting marble surfaces;"miltos" or red lead was also used. "Minium", the vermillion of the Romans was not used in the best Greek period for large surfaces, but only in ornamentation. The Romans used it to a large extent.

Vitruvius, in comparing ancient with contemporary art, wrote: "The ancients labored to accomplish and render pleasing, by dint of art, that which in the present day is obtained by means of strong and gaudy coloring, and for the effect, which was formerly obtained only by the skill of the artist, a prodigal expense

is now substituted. Who in former times used minium otherwise than as a medicine? In the present age, however, walls are everywhere covered with it". (Book VII, Chap. 5). To protect this color from the action of the sunlight, Vitruvius gives the following instructions: "When the wall is painted with vermillion and dry, lay on with a brush Punic wax melted over the fire and a little tempered with oil; then by means of hot coals in an iron vessel, warm the wall well and make the wax run and equalize itself; afterwards rub it with a wax candle and clean cloths as nude marble figures are treated". (Book VII, Chap. 9. Pliny describes this same process and gives the preparation of wax which is, chemically, twenty parts of wax to one of soda).

A beautiful rose color has been found on some sculptures but we are not informed as to its nature.

Blue of several kinds has been found: a strong and transparent color; a brilliant and covering ultramarine, not much used in the earlier buildings but later employed for the triglyphs; a soft light cobalt, such as found on the external metopes of the temple of Zeus. The deep blue was the kind used principally on details.

A portion of the blue coating from the Antae of the Propylaea showed, according to Dr. Faraday's analysis, (Transactions R. I. B. A., Vol. II, p. 42), that it was produced by carbonate of copper; wax was found mixed with it. The blue from the mutules of the temple of Theseus proved to be a frit or vitreous substance colored by copper, and also showed the presence of wax. The blue analyzed by Professor Landerer was found to be copper oxide.

Bluish black, mostly with a tinge of violet was especially found at Olympia. It appears as a glazing color and has generally

penetrated deeply into the stucco, so that, where this is thin, the stone underneath it is stained. From this it may be concluded, that it was applied as a water or lime color on the wet stucco, or as a melted wax color on the previously heated surface and then ironed, according to the rules of encaustics.

It was used chiefly on the Doric entablatures of the earlier period, as for the triglyphs and corresponding members.

Black was used sparingly as an accent. It appears on the Cymatiums of the Leonidarion and the South-East building at Olympia and also in Sicily. Durm is sceptial concerning black and believes it to be merely a transformed blue produced by chemical changes. (Griechischen Architektur, 3rd ed. Chap. 6). Professor Landerer analyzed two blacks from ancient fragments found in Athens: one proved to be a mineral and contained burnt iron, which apparently, having been reduced to a powder, was mixed with oil or wax. The other black contained organic or animal matter and seemed to have been made of a charcoal of animal or vegetable origin, probably from bones. (Architecture Polychrome, p. 550).

Yellow appears to have been used in a great variety of tones. The deep and brilliant yellow was always a covering color, used on the cyma, where it is chiefly the ground color, or as a leaf color on the Corinthian capital from the entrance to the Stadion at Olympia, etc.

Chemical analyses have proved the yellows to be ochre, which is found in a wide variety of hues. In the older style in Italy and Sicily, yellow ochre was used as a ground for the mural decorations, while red was used only as an animating element in the color melody, thereby differing from the early style in Asia Minor

and Greece where red formed the basis of polychrome decoration. (Semper Der Stil, Vol. I, Sec. 80).

Green seems to have been employed by the Greeks rather sparingly. On the Parthenon and Propylaea, Penrose noted some remains of a brilliant green, which he insists was always green and not formerly blue, as certain persons suggested to him. (See Penrose's Principles of Athenian Architecture, p. 60, note). Frequently, however, the color, that now appears to be green was once blue, as may be determined by tracing it in the deeper crevices, where it has retained its original hue. On some archaic sculptures found near the Parthenon a true deep green was observed, together with a green, which was a transformed blue.

The green color from the cornice of the Pinacothek, according to an analysis by Professor Landerer proved to be an oxide of copper united with acetic acid, from which he concludes that the ancients were acquainted with verdigris. The presence of wax was detected.

White of two kinds was analyzed by Professor Landerer: one proved to be carbonate of lead, such as white lead; the other lime and clay. It is probable that the ancients used the mineral called bolus-alba or arnona. We are not informed as to whether the Greeks were acquainted with the wonderful white used by the Egyptians.

Violet was used in the Hellenic period, especially on marble sculptures, and in all periods on painted terra cottas and vases. We have no data concerning the chemical analysis of this color.

Gold, according to inscriptions and literary evidence,

was used quite extensively in the decoration of architectural members, but has almost entirely disappeared. It has been preserved occasionally in the hair of statues. A particular smoothness of surface or a brownish hue bear witness that originally some gilding was there. Garnier thought he could prove oxide of gold on the capitals of the columns at Egina.

Thus we see that the ancient Greeks must have been acquainted with a sufficient number of pigments to be able to produce a wide variety of colors, and that their polychrome system could not have been restricted to "daubs of red and blue".

Technical Methods

The application of colors was sometimes made directly on the stucco ground while it was yet fresh, as in fresco painting; marble surfaces frequently show some special preparation. The parts covered by transparent colors, such as the columns, architraves and walls, were carefully polished smooth, as well as the delicate members of the architectural portions to be decorated. As the joints were not accented, they were carefully executed so as not to show, when not concealed under a coat of stucco.

In many places, and this must have been the oldest precedure, the ornamental drawing was incised in the marble or fine grained limestone, and the parts thus outlined were filled in with color. In other cases the ornament was lightly sketched with a steel point and the ground scraped or roughened, so that the colors would adhere better; in yet others, the ornament was sketched directly with the brush on the smooth stone without a preliminary outlining of the forms. Likewise the separate ornaments were perfectly wrought and afterwards painted. (Durm, 3rd ed., Chap. 6).

The large surfaces of the plain portions were probably covered only with a simple transparent coating such as that of saffron and milk, as Pliny mentions.

The fact that wax has been found so generally in the fragments subjected to chemical analyses, seems to prove, that the colors were mostly fixed on the surface by encaustic, that is, by means of wax and fire. The encaustic method had much to recommend it: it could be used either on stone or stucco surfaces, while fresco could be applied only on the latter. Also for the fresco certain colors could not be used, because their pigments would decompose in the lime used as a vehicle. The encaustic method insured brilliancy of color and protected the surface against the weather.

SECTION VII.

Architectural Terra Cotta.

Because of the distinct difference between the polychromy of architectural terra cottas and that applied directly on marble or stone members covered with stucco, we shall treat the subject under a separate heading. Moreover, terra cotta played such an important part in Grecian architecture, that it is quite worthy of a special place in our discussion.

" It is to be remembered, that works in clay with burned-in colors correspond in their technics to the cymas of buildings decorated by ornaments, and figure acroterias of terra cotta, of which numerous remains are preserved from the archaic period, and these have a polychromy entirely different from that of the stone sculptures. As a rule, everything painted blue on stone sculptures here appears black or brownish black; what is there light red, here becomes deep brownish red. But this difference is based only on the technical methods; these vivid colors, that men really desired and which were applied, where they were free to do so, were impossible on terra cotta; the black of the terra cotta was certainly invented only as an imperfect substitute for the beautiful blue." (Furtwaenglers Aegina, Vol. I following p. 46).

The earliest group of architectural terra cottas are from the Heraion (10th Century). (See Plates 115 and 116 from Curtuis & Adler's Olympia.) They are characterized by a smooth unglazed surface, and, according to the burning, are either blackish brown or reddish brown on all external surfaces. In this ground, the ornaments are incised, then painted in opaque colors

which are yellow and violet. These colors are not burnt in and have mostly vanished, so that now they can only be recognized with difficulty. No less characteristic is the painting of the ornament, the plain beaded astragals and rosettes in relief; the surface ornament is limited to simple linear forms like circles, scales, chess-board and zig-zag patterns, together with interwoven bands and wavy ornament. Plant forms do not occur.

In the oldest Silician terra cottas, the ground is a warm yellow, from which rises the ornament in the rythmic alternation of two dark tints, black and red. This mode of coloring was also the rule in Greece until about the sixth Century. (The earliest examples of this kind is represented by the cyma and mutules in Figure 20, Curtuis & Adlers Olympia, Vol. II, text, p. 200).

Painting in dark colors on a light ground was retained in Italy until a relatively late time, but in Greece, on the contrary, with the beginning of the fifth century, another principle is the rule, where as in the red figured vase painting instead of the light ground, there appears the black glazed one, yet without outlines incised therein and opaque colors applied after burning, but with ornaments in light yellow left unpainted. These are the well known anthemion patterns which extend in one direction upward, together with wavy scrolls and a new ornamental motive borrowed from the series of natural forms, the acanthus foliage, which was to form the classic ornament of Grecian art. These patterns rise distinctly from the black ground. Certain parts, as the eyes of the volutes, the leaf cups, and in part the borders also, are painted red. The black ground is entirely similar to the glazed ground

of the red figured vases.

To receive the colors, the surface of the terra cotta is frequently coated with the clay differing from that of the body, called "slip". In the coating, the outlines of the ornament were scratched with the pointed tool and compasses, then being painted with the brush. On the terra cottas of the second type with a warm yellow ground, a light clay containing lime is also applied first, and then the drawing is incised and painted later. The scratches and center holes of the compasses, as well as frequently special guide lines drawn with a rule, are all plainly visible, and they prove that no stencils were used. (A convenient method for the repetition of the drawing is observed in Figures 5 & 6. Plate 116, also on the fragments in Figures 20 & 24. Page 201, Curtius & Adlers Olympia, Vol.II text.) The outlines of these ornaments here have delicate raised edges, produced by the pressure of moulds with corresponding incised lines. The antifixas are usually formed with a slight relief, obtained by pressure in the hollow moulds. The first antifixas were merely painted.

After painting and while in an air-dried and leathery condition, the pieces were smoothed with a spatula, which produced the matted glaze of the surface, and they were then burned. Only in a few cases does the burning approximate the limit of fusing, like the terra cottas of the Leonidaion. Least burned are the terra cottas of the second and third kinds, which belong to the classic period. These remain as famous evidence for the antique process, for example, the terra cottas of the Treasury of Gela, that after existing for a thousand years, then broken in pieces

and exposed to dampness for fourteen centuries in the foundations of later walls, they were, mostly found with nearly perfect freshness of the colors. (The foregoing is principally an extract from Curtuis & Adlers Olympia, Vol. II text, Chap. 37).

Terra cotta ornamentation for buildings was in very general use in Greece down to the end of the sixth Century B.C. It was the ancient traditional covering for wood, and even in the best period continued to be used as a covering for roof beams. Both the external wooden timbers and the internal wooden ceiling of the archaic temples were entirely covered by richly ornamented terra cotta plates. Hittorff mentions the discovery of antique roof tiles painted on both upper and under sides, which seems to indicate that they at the same time formed the external roof covering and the internal ceiling decoration. (Architecture Polychrome, p. 18). The details, for which terra cotta was generally used, included two binds of roof tiles, -- flat and covering tiles--, the covering slabs along the edges of the pediments, the antifixas along the sides of the building, and the acroterias at the apex of the pediments. In Sicily and Italy there survived a custom of nailing slabs of terra cotta over the surface of the stone work, originating no doubt when the buildings were of wood.

SECTION VIII.

The Coloring of Sculptures.

A. The Sculptures of the Architecture.

The subordination of sculpture to architecture was characteristic of the arts preceeding Grecian; it remained for the Hellenes to develope sculpture to the highest point of an independent art, and yet without completely detaching it from the influence of its architectural environment. The relation between sculpture and architecture was one of harmony and mutual benefit.

Sculpture was early applied to the decoration of the temples: the pediments, the metopes, the long friezes and the interior of the cellas were especially prepared to receive sculpture. A complete evolution in sculpture may be traced from the remains of fragments of metopes and friezes of the various monuments, from the earliest period up to the climax and then passing through the decadence. In the metopes, the sculptures are in lao relief; in the friezes, they are in low or high relief; the figures of the pediments are always in the round, executed in the studio,and only when the building was finished, were placed on the horizontal cornice and fixed to the tympamum by metal cramps. The artistic and economic advantage of the round made this desirable for the elaborate compositions, which filled the tympamums of the pediments.

Numerous remains of color have been found on the sculptures as well as on the architectural members. The intention of the primitive artist may have been to imitate nature as nearly as possible, but the limitations of obtainable colors imposed upon the sculptor a certain amount of conventionality. Dark blue was

used, probably in the first place as a substitute for black, for the hair and beard and also as an entire covering for a horse or bull. (Gardner's Handbook of Greek Sculpture, p. 28 ff).

On the early archaic limestone sculptures, entire surfaces were strongly colored. Among those found on the Acropolis at Athens belonging to the sixth Century were those from the Hydra pediment: entire bodies of the horse are blue; the flesh of the men is rose-colored, the chariots are a deep brick red; the heads of the Hydras are light green with red mouths; the back-ground is white. On the bull group of the Acropolis, the entire body of the bull is a strong deep blue; only details, such as pouring blood, and the insides of the ears and eyes are red; the entire body of the lion is red. On the so called Typhon pediment, the hair is painted with a deep and thickly covering blue which has turned to green; the color of the flesh is a tolerably deep red, where it is well preserved; the eyes are green, the breast red, the bodies of the serpents are red and blue.

The maiden figures of the Acropolis, executed in Parian marble, where excavated about twenty-five years ago,(Described by Russell Sturgis, Harper's 1890) showed numerous remains of color, though much of it rapidly disappeared. This seemed to be due , not to the fading of the colors, but to a separation of the pigments from the surface of the marble caused by the action of the atmosphere. Gilliéron, a Swiss artist, was employed to make water-color studies of these sculptures at half size, and to represent the colors exactly as they were at that time without making any changes or interpreting them in any way. Thus, the color,

which was very bright when the fragments were first exhumed, has been carefully recorded for us.

In one of the female figures the undergarment was painted green over its entire surface, which was not great; the overgarment had decorated bands of several colors and was strewn with stars, having their points alternately red and black. On another female figure the chiton was pink, evidently crimson. Another had a garment merely bordered with dark green figures. Some of the vivid green seemed to have been blue once, since the blue may be detected unchanged in the deeper folds of the garments. Yet bright emerald green was found on many of these sculptures, together with red, blue and black. On one of the larger figures, the chiton and the upper garment were adorned by scattered ornaments and a broad border with a pattern in red and blue; on the sleeve of the upper garment were wavy blue lines; the hair is red, a vivid, deep blood or cherry red, not the brownish red used in later figures. A soft lavender gray was found on one figure. The pedestals on which the statues stood show some incised inscriptions painted red. On some of these sculptures were white spots, showing that the paint had disappeared, though otherwise the marbles were of a warm and pleasant yellowish-gray color. These sculptures, although archaic, are full of grace and beauty, and their coloring is certainly not due to any barbaric tastes.

At Egina the sculptures retained numerous traces of color but Furtwaengler says he found only red and blue there, although he does not deny that other colors may have been used originally, yet have since disappeared. The backgrounds of the

pediment sculptures was blue, the soffit of the cornice above them and the marble supports, on which they stood, were red. The marble figures must have been in harmony with these richly colored surroundings . On the figures of the Eastern pediment Furtwaengler observed the following facts:

The clothing of the Athena-- from a fragment of the bottom of her garment-- is entirely covered by a vivid red. It is probable that the entire upper garment was red, and as a great deal of this garment was visible, it presented a considerable area of red. On the external side of the Aegis of Athena are traces of scales painted alternately red and blue. There is a trace of blue on the front of the shield; there is also a considerable vestige of blue on the helmet. The blue is a deep and intense thick covering blue . On the figure to which the helmet belonged was a vestige of red on the arm, which must have come from the chiton.

There is a trace of red on the girdle of Hercules, as well as a trace of a large square covered by a varnished color. The edge of the armor on the front of the neck was not sculptured at all, but only expressed by painting.

On the tight sleeves of the Scythian archer are traces of red as well as a vestige of a painted ornament, corresponding to the usual ornamentation of this Scythian archer's clothing on the red figured vases.

There are numerous remains of painting on the shields but only the red color has been plainly preserved, but which entirely covered the inside of the shield of the pediment figures; it is impossible that the edge and outside were colored differently,

although this color has disappeared. On some of the shields, the outside was red; the recessed border of the shields was colored otherwise, certainly blue; in the middle is a circle with some traces of black; there was evidently some emblem painted on the shield.

Furtwaengler is of the opinion that the painting of the figures of the western pediment differed from that of the eastern by the painting of the entire surfaces of the garments. The Athena of the western pediment wore an upper garment, that seemed to have been adorned only by borders and ornaments, otherwise being left white. It appears that the colors were employed ina graceful and frequently interrupted manner, while broad quiet surfaces predominated in the eastern pediment.

No vestiges of color are preserved on the hair or beard; but because of the locks of lead in some places, they were doubtless coated with color. The eyeballs and lipd were painted --doubtless red-- as results from the greater smoothness shown by the surfaces of those parts on several heads. Wagner believes that he noticed traces of red on the wounded men, representing streaming blood, as frequently indicated on the deep red figured vases. The flesh surfaces were uncolored.

The weapons, partly in bronze and partly in marble, may have been painted. Cockerell thought they were gilded.

On several fragments of the wings of the griffen are evident traces of painted feathers. In several instances parts that seem to have been unfinished, so far as the sculpturing is concerned, were undoubtedly painted.

The red and blue found at Agina are purely metallic color:

iron for red, and copper oxide for blue. The colors were applied in thick or thin coats as desired. Furtwaengler asserts that gold could be proved nowhere, which is the general case with the archaic sculptures; but it may have entirely disappeared.

Wagner described the statues of Egina as they appeared when they arrived in Rome, and this description agrees with that of Furtwaengler's in that only red and blue were to be seen. The red, he thought, was sometimes a deep vermilion and sometimes an earthy red, which resembles it very much; the blue had the appearance of ordinary azure. There were not found on the figures any yellow or green, which probably resist less strongly the saline moisture of the soil. The red was preserved more brilliantly than the blue. (Hittorff and Zanth, Architecture Antique de la Sicile p. 590).

At the moment of the uncovering of the Egina statues, Cockerell made the following note: "The lances, points of the swords and the helmets are lightly gilted, as well as the quivers; the scales of the breast-plate are marked with gold; the head of Medussa is gilded; the draperies of Minerva are bordered with rich bands; the hair is colored a light brown, the eyes are a distinct blue. The shields show on the inside a large central part, red with a plain yellow border; on the outside the large central part is yellow with a first border of blue and a second of yellow; the horsehairs of the helmet are red." (Hittorff & Zanth, Architecture Antique de la Sicile, p. 591).

On the Giants' pediment, archaic, of the Acropolis, the garments of Athena(marble) were not painted but only ornamented by

borders of bright colors. Her hair is a strong dark red, the helmet blue; the Aegis is covered with blue and red scales; the serpents have a wide blue stripe, but are not otherwise colored. The hair of the three fallen giants is covered with the deep, intense and thickly covering blue, like that on the hair of the Typhon.

The marble cyma of the so called temple of Pisastratos, where the lions' heads have dark blue hair and green eyes.

The reliefs of the Treasury of Cnidos, Delphi, were found to have colors well preserved at the time of their discovery, but which have since almost disappeared. The shields were painted red on the inside, as at Aegina, and the recessed border is red. Successive interwoven bands with black outlines following the circle were found on the red insides of the shields. On the outside of the shield of the giant with the crested helmet, there is a trace of blue. The chiton of the Hercules of the Gigantomachey was entirely red. On the lions of the chariot of Cybele, the flesh is not painted, merely the harness and yoke are red; the tails and manes of the horses are red; the back of one chariot is red, and on one shown obliquely the entire surface is red. The background of the figures is blue. In general this frieze must have been very similar to that at Egina.

The sculptures of the pediment of the Treasury of Megara at Olympia are of soft limestone, but are painted like the marble sculptures of the same period. The ground was sky blue; traces of red were found on the helmet, shields, clothing, hair, lips, eyes and eyebrows, the flesh surfaces were uncolored.

The marble sculpture from the pediment of the temple of Zeus at Olympia are painted in a broad and grand style; large surfaces are covered with color. (The remains of their coloring are given by Treu in Jalub du Arch. Inst. X, p. 25 & seq.) The background is light blue. On the fragments of the metope sculptures, there was found more color than on those of the pediments. It is probable that the pictorial decoration of the frieze was very rich in effect. The metopes which accompanied the mural paintings of the portico must have been enhanced with more lively tones and more numerous applications of metal. On the red (Laloux) ground of the metopes were doubtless attached some white parts; but the hair and lips of the persons, the bodies of the wild beasts, and the monsters, as well as some other parts were strongly painted in red, brown, yellow and blue. These strong tones softened the effect of the sculpture, which today, with the cold monotone of the marble, appear a little stiff in their naive drawing and their powerful modeling. (Laloux's statement that the ground of the metopes was red is contrary to the majority of statements that it was the same blue of the pediments).

On the figures of the frieze of the Temple of Theseus, Semper noted that in the folds of the garments these were very fresh rose red and green in thick opaque coats, against the blue background.

The folds of the garments of the Caryatids of the Erectheum(now in British Museum) show blue.

Paccard has recorded his observations on the sculptures of the Parthenon: "On the figures still in place on the western pedi-

ment, we see on the mantle of one of them some evident traces of blue, an actual coat of wax about one millimeter thick, and on the upper part of thetunic are some traces of green. According to the place of these colors and their tone, the garments must have been entirely painted and not merely with simple ornaments. On one of the metopes showing a centaur trying to carry away a young woman, the entire tunic of the woman is a beautiful antique green and the rump of the centaur is covered with a brown tone.

On the Panathenaic sculptures are numerous traces of color: the mantles of the horsemen are generally blue, some other parts of the garments being green. On the ground of the lao-reliefs are some traces of red". (Hittorff & Zanth, Architecture Antique de la Sicile, p. 593-94).

The German sculpture, Herr Carl Cauer, professed to have discovered, that the frieze of the Parthenon was originally gilded and then painted, so that the gold showed through in places.

The so-called Lycian Sarcophagus of Sidon, dating from the fifth Century B.C., has a blue ground well preserved, being the strong deep cobalt of the ancient period. The Sphinxes and griffins on this blue ground are uncolored save for the red details of hair and eyes.

The relief frieze on the Sarcophagus of the Mourning Women from Sidon,- fourth Century-, have the simple red, blue and yellow as prevailing colors. The hair is the strong vivid red of the archaic period. Violet and rose occur as less important colors. On the so-called Sarcophagus of Alexander, (also fourth Century) violet is the principal color with yellow as secondary.

The shields are in part violet on the inside and yellow outside; but blue and red are not lacking. The inside of one shield is blue with a red margin. The helmets are blue or yellow, the hair is brownish red or yellow. On these Sarcophagi there are large colored surfaces. The entire mantles of the mourning women are mostly red; only the chitons, the undergarment of which little is visible, remained mostly white. Entire garments on the Sarcophagus of Alexander were also colored. The ground of the reliefs was white, and the colored figures stood out from it; this is in contrast with the strong early style where the colored figures are placed on a colored background of a contrasting hue.

B. Miscellaneous Sculptures of Stone or Marble.

The miscellaneous sculptures in the round, sometimes statues of the gods and sometimes exvotos, were also colored, but possibly not so conventionally colored as the bas-reliefs. There may have been some cases where the color was quite conventional, however, since Pausanias(Bk. 8, Chap. 39) describes a statue of Bacchus having "all those portions, not hidden by draperies, painted vermillion, the body being of gilded wood."

In his seventh Eclogue, Vergil describes a marble statue of Diana with scarlet sandals bound round the leg as high as the calf. In an epigram he offers Venus a marble statue of Amor, "the wings of which shall be many colored and the quiver painted, because it is customary."

Praxitiles, when asked which of his statues he preferred, answered, " those which Nicias had had under his hands." Nicias was renowned as a painter and therefore it is most probable that he

painted statues for Praxitiles.

Quatréme de Quincy mentions color on statues, that he has seen, and he refers particularly to the Apollo in the Louvre, made of Pentelician marble, almost all over the wide surfaces a trace of red being faintly perceptible. A Diana at Versailles was also painted red, but he adds, "the traces grow fainter daily."

The Venus de Medici still shows traces of gilding in the hair. The Diana found at Herculaneum in 1870 has blonde hair; the draperies are white with a triple border, one of gold, one of purple with festoons of flowers, the third being plain purple. (The Builder, 1854, p. 333).

Some statues found at Athens, (See Architecture Polychrome, Pl. 14, Figs. 2,3,4, 5), all belonging to different periods, show a yellowish flesh tint that is not the exact tint of nature,but is sufficient to represent it. The hair was painted yellow on the whole surface, and the high lights touched with gold.

The beautiful marble statue of Venus found at Pompeii shows some interesting polychromy. The upper part of the body is nude and unpainted; the legs are covered by an orange mantle lined with grayish-blue; the hair is a warm yellow; the eyes and eyebrows are black and the ears pierced as though jewelled ear rings had once been inserted there. The small archaic figure on which Venus leans is dressed in a green and yellow chiton. The coloring of sculptures must have prevailed at Pompeii as Mr. Edward Robinson, who recently studied the wall paintings there, found that not a single painting of a statue represented it as white, but that there were numerous instances of colored statues.

C. The Chryselephantine Statues.

"The earliest statues, rude idles, were of wood, consisting of the trunk of a tree for the body, a cone with some lines for the head, a projection at the base for the feet, and some excresences in the middle represented arms." (Hittorf & Zanth, Arch. Ant. de la Sicile, Bk. 9, Chap. 8). As the people were taught, that these idols were divinely inspired, it was difficult to make any changes in them without destroying the common religious beliefs. Hence sculpture, which had its origin in religion, had its developement arrested at its very source, and it was a long time before any progress was made in this art.

Wood, the primitive material, required paint to preserve it, and doubtless this was the origin of polychrome sculpture.

Long after sculpture had emerged from its primitive restrictions, wood continued to be a favorite material. Pansanias frequently mentions statues of cedar wood or of beech wood, and even those of ebony. "And these were statues were statues of black ebony wood. Even the horses are mostly made of ebony though partly of ivory." (Pansanias, Bk. II, Chap. 22).

To the primitive tree trunk were gradually added heads, arms and feet of marble (acrolithic statues), or of precious metals. The statue of Athena the Bridler was made of wood, but the head, hands and toes were of white stone. (Pansanias Book. II, Chap. 4). At Aegira was a statue of Zeus the head, fingers and toes of which were ivory, the rest of "wood gilt and richly variegated." (Pansanias , Bk. VII, Chap. 26).

Draperies of richly embroidered stuffs were added to the crude idols in order to make a stronger appeal to the senses of the people. This no doubt gave rise to the painting of those parts of marble statues which represented clothing.

When the wood statues were covered on the flesh parts with ivory, and the draperies became gold, we have arrived at the Chryselphantine sculptures. They date back as far as 580 B.C. Small figures of cedar wood were overlaid with gold; a statue of Apollo was of beech wood with a gilded head. It remained for Phidias (500- 432 B.C.) to attain the highest pinnacle of Chryselephantine sculpture in the famous Athena of the Parthenon and the Olympian Zeus, which bore witness to the spiritual evolution that had been accomplished in the religious ideas of the Greeks. Both were of colossal size, the former is a standing figure the latter seated. "But one admired the art rather than the size." (Pansanias Bk. I Chap. 18).

Of the Olympian Zeus, Pansanias has given us a vivid description. "The image of the god is in gold and ivory, seated on a throne. And a crown is on his head, imitating the foliage of the olive tree. In his right hand, he holds a victory in gold and ivory, with a tiais, and crown on his head: and in his left hand is a sceptre adorned with all manner of precious stones, and the bird seated on the sceptre is an eagle. The robes and the sandals of the God are also golden: and on his robes are imitations of flowers especially of lilies. And the thrown is richly adorned in gold and precious stones,with ebony and ivory. And models are worked on it, etc. " (Bk. V, Chap. 11.)

The ancient writers were in general enthusiastic over the Olympian Zeus. " Phidias has ascended to the skies, or the God has descended to the earth." (Anthology IV, 6).

The Chryselephantine statues were built up of wood; the flesh parts were overlaid with ivory, the garments usually of gold or gilded wood. The eyebrows and lips were etched in delicate lines, the pupils were sometimes of precious stones. Pansanias mentions a statue of Athena in the temple of Hephaestus,(Theseus,) Athens, which had gray eyes. The borders of the garments were sometimes damascened with silver or painted, as on the Olympian Zeus. Golds of several colors were also used. Plutarch speaks of"those who colored the gold". We do not know whether the ivory was colored or not but Hittorff thinks it must have been covered with very transparent tones to harmonize it with the rich polychromy of the garments. (Arch. Ant. de la Sicile , p. 644). It is probable that an encaustic wash, used to preserve the ivory, would give it the proper hue to suggest flesh color.

Quatremere de Quincy, in his work on Le Jupiter Olympien, has treated chryselephantine sculpture so thoroughly that it is scarcely worth while to take up the subject, except for its part in the developement of polychromy. In 1854 the Duc de Luynes attempted a restoration of Phidias'Athena of the Parthenon, on a much smaller scale however, (only 8.53 feet high). The execution was entrusted to M. Smiart, a skilled workman in ivory. The result was very pleasing but it was naturally quite impossible to judge of the full effect of the original statue, surrounded by its proper architectural environment.

D. Statues of Bronze and Other Metals.

Most people are inclined to think of Grecian sculpture as being of marble, and entirely white at that, but bronze was really the material most preferred by the Greeks for their statues. Bronze was used in a variety of colors from very light to dark. For the statues of atheletes bronze represented the sunburnt appearance of the skin. Bronze working was brought to perfection by the Greeks at an early period, probably about the beginning of the sixth Century.

Pansanias mentions many statues of bronze, some of which were gilded. There is no doubt that polychromy was employed in bronze statues and that artificial means were used to obtain the colorings. There is some evidence that the Greeks may have used an artificial patina, made by combining a basis of sulphur with silver, iron or lead, according to the color desired; this, when spread over the bronze surface and heated, would produce a patinated surface of sulphurate of bronze. But it is likely that the patina of most of the ancient bronzes is due to natural chemical action of the soil in which they were buried.

Existing specimens of bronze prove that they have even been coated with paint. Damascening with silver and gold, and the use of precious stones and enameling contributed further to increase the polychrome appearance of bronze statues.

Silver was occassionally used for statues but it is probable that these were small. Pausanias noted that"near the council chamber of the Five Hundred is the room called the Rotunda and there are some silver statues, not very large." (Bk. I, Chap. 5).

Brass statues are mentioned more frequently by Pansanias than those of silver, and it is probable that they were quite prominent. He speaks of a statue of the Supreme Zeus (in Laconia) as "the most ancient of all brass statues, for it is not carved in one peice but forged piece by piece and deftly joined together, and studs (rivets) keep it together and from falling to pieces." (Bk. III, Chap. 17).

At Corinth was in the part of the market place, which is in the open air, a Zeus in brass, the work of Lysippus, and near it a golden (gilded) Artemis." (Pansanias, Bk. II, Chap. 9).

E. Terra Cotta Statues.

Besides wood, clay was also used for primitive idols, but the perfection of terra cotta images was not reached until a late period of Grecian art. Both Greek and Latin writers bear testimony to the primitive use of clay for sculptured images. Rude idols of this material, found in Cyprus and elsewhere, date back to the Mycenean period. Another class, dating from about the seventh Century B.C. are known as the Columnar type, probable rivals of the tree-trunk idols. The features are sketchily modeled or indicated rudely in black paint. (In Boetia some figures of this period were found having heads fairly well modeled, and are interesting, especially for the manner in which they are decorated with patterns in black and purple, recalling the contemporary vases.) (Walter's Art of the Greeks, p. 187).

Unlike the wood images which developed finally into the colossal chryselephantine statues, those of terra cotta were, from

the very nature of their material and technical considerations, of very small size, dwindling finally to mere statuettes, sometimes no more than dolls. Their use is not exactly known but it is not improbable that they were used as offerings, household images, or chiefly for funeral purposes. They are interesting in connection with this study principally on account of their color.

Many of the archaic statues were grotesque in character and showed Oriental influence. In the fifth century terra cottas, there was a developement of relief work showing mythological subjects and were probably votive plaques. The typical terra cottas of the best period (fourth Century B.C.) represent almost entirely genre subjects; statuettes found at Tanagra, which are most famous and of the most perfect workmanship, belong to this period. The industry flourished in many other places but Tanagra was the center. At Cyprus were found some of the most primitive types. Rhodes, Sardinia, Asia Minor, Egypt, and Sicily also furnish many remains. The Sicilian terra cottas show a marked individuality. At Selinus has recently been found a votive series, exhibiting a wide variety of types, all richly colored.

As a rule, all statuettes were colored, although on very many of them the color has disappeared with the "slip" covering of the surface. The draperies were sometimes striped with red or blue, or painted entirely in one of these colors. Black and red, or deep yellow was used for details, such as the hair; Gilding was but rarely used. In the terra cottas of the Hellenistic period, when this art was most highly developed, an enameled glaze is sometimes found, usually gray but sometimes pink or orange to suggest flesh tints.

"The charming little terra cotta figures from Tanagra help us to realize more distinctly and vividly the world of forms, which ministered to the taste of the epoch of Praxiteles. The marvellous grace and beauty of the attitude, motion and form, the inexhaustible variety attained with an apparently small number of models, and the brilliancy of the coloring on the best preserved specimens have spread their fame world-wide. Now we know just how Grecian polychrome sculpture looked, at least on a small scale, and can delight in the lively,brilliant, yet harmonious coloring of these women and girls, with their rich yet graceful drapery, their palm leaf fans and their broad brimmed hats." (Kekule in Badeker's Greece, 2nd Ed., p. XCVII. Quoted from Walter's Art of the Greeks, p. 195).

Our point of interest to be noted before leaving the subject of terra cottas is analogy between many of these statuettes and the playful Cupids of the Pompeian wall paintings.

F. The Coloring of Stone and Marble Sculptures.

The principal objection to the coloring of marble sculptures is that the effect is evidently too gross and materialistic, that the spirituality is destroyed. This might be very true if the Greeks colored their sculptures with the intention of copying nature to the extent of exact imitation, but from our previous review, this does not seem to have been the case, at least in the best period. That the application of color to sculptures destroys the subtelies of form and detracts from the fine modeling does not seem to be true, according to actual experiments. Mr. J. L. Smith, who colored two statues, the Hermes of Praxiteles and Venus

Genetrix made the following observations as the result of his experiments:

"Color, even when applied as a coating, instead of diminishing the modeling, heightens it and to a very considerable extent. Far from hiding the sculptor's work, it brings out its beauty. The more delicately he models, the more will color emphasize its delicacy; and if his own work be poor, the color will accentuate his defects." (Von Mach's Greek Sculpture, p. 73).

(The effects of Mr. Smith's experiment were unpleasant, probably due to the fact that he made the colors too realistic.)

Mr. Hittorff made similar observations: "The coloring of the sculptures required of the artists care and extreme finish. We have been able to convince ourselves of this by experience. A group due to the talent of Mr. Duret, of the Institute, and executed with a remarkable precision, after the application of the colors, although very light and very transparent, showed a number of ineqalities which it was impossible to suspect before." (Hittorff & Zanth, Arch. Ant. de la Sicile, p. 635, note.)

The extent of the application of color to the flesh parts is difficult to determine from the remains, and there are a great variety of opinions regarding it. Von Mach (Greek Sculpture p. 72) states emphatically that "on not a single statue have any traces of paint been found on the flesh parts". But we have already noted some evidences of this above. It is true that on the majority of the sculptures the flesh part is uncolored, but it may have been that a more fugitive color was applied there. In general, however, the flesh parts, instead of being entirely white, have a warm yellow-

ish tone, that may have been produced by the encaustic treatment, and which is sufficient to represent flesh. Although we cannot believe that the sculptures were intended to exactly imitate nature, yet there must have been some relation between the tones, harmonious in effect, and representing or interpreting without imitating. If the eyes and lips were painted , even though not in the colors of nature, (frequently the eyes were red) the flesh parts must have been softened to a tone, that was in the same key as the details.

Hittorff mentions, that flesh color was found on the nude parts of the colossal figures of the temple of Jupiter at Agregentum. He also says that, "the remains of coloring found on the sculptures prove incontestably their entire coloration.(Arch. Ant. de la Sicile, p. 637). "We have been confirmed in this opinion by an experiment, which showed us the frightful effect of figures where the painted lips and eyes stood out against the natural tone of the ivory or the marble; their whiteness recalls the pallor of death and make them look like petrified spectres. A light flesh tone on the other hand, produced the most harmonious effect; the appearance of life gives to the face a real charm; the absence of all movement communicates to it an undeniable majesty."

We have noted that on the archaic limstone sculptures from the Acropolis, the flesh of the men was rose colored. It may have been possible that there was a convention in sculpture similar to that in vase painting, whereby men were distinguished from women by the color of the flesh, except perhaps that the convention was not so complete, i.e. , the difference between the flesh of the

sexes may not have been so much contracted but more nearly of the same tone; a reddish color for the men, a light transparent tone on the marble for the women. (See Arch. Ant. de la Sicile, p. 638).

The early stone sculptures show entire surfaces painted in a few strong colors, which must have produced a vibrant note in the architecture, which they adorned. The introduction of marble influenced the polychrome system to some extent perhaps, but color was not entirely discarded. Thus the archaic marbles of the sixth century show color in broken areas and borders, and also on ornaments scattered over the white areas. Strong conventionalization is still seen in the vivid blood red of the hair; we could not expect any attempt at naturalistic coloring of the flesh. In the fifth century, when sculpture was at the point of its highest developement just after the Persian wars, there was a revival of the free and grand style of broad colored surfaces; a reaction against the weak polychrome system of the previous style; but red and blue were still prevailing colors and the system had not lost its conventionality.

In the fourth century there was a wider variety of colors used on the sculptures, the hair painted yellow or a dark brownish red. Sometimes the high lights of the hair was touched up with gold; we may now expect a more nearly idealistic treatment of the flesh.

Socrates, the son of a sculptor said: "Just as if when painting statues, a person should blame us for not placing the most beautiful colors on the most beautiful parts of the figure-- inasmuch as the eyes, the most beautiful parts, were not painted purple

but black-- we should answer him by saying, Clever fellow! do not suppose we are to paint the eyes so beautifully that they should not appear to be eyes! "

SECTION IX

Mural Painting

A. General Considerations

We have noted, that in Egypt and Assyria there was no art of painting, as we understand the term today,- only a filling in of the outlines with flat colors, which could be done by any common workman, and especially when the exact color was laid down by tradition. This painting served only as a handmaid to architecture, to decorate large unbroken surfaces, and to tell a story according to some accepted though childish conventions. It was not an end in itself, merely a means, and as such had no independent esthetic expression. Perspective and chiaroscuro were unknown, and without these technicalities, painting could not progress beyond mere ornament. It remained for the classic Greeks to develop painting to the point that, finally, in the late period it became only an exhibition of technical skill, and entirely lost its decorative value.

From literary criticisms, we may judge that the Greeks esteemed painting very highly, and that it occupied an important place in their arts. Owing to the fact that no original Grecian paintings have cone down to us, other than those on vases and the mural paintings found on Italian soil, which could not have been representative of the best and highest phase of art, we are unable to pass judgment on them today; but we feel justified in believing that the art of painting must have attained a very high point of excellence among the Greeks, to be ranked with their products in architecture and sculpture. The high standard of excellency in the composition and purity of lines of vase paintings, which were

the work of artisans and probably copies from mural compositions, leads us to wonder what the master pieces of the real art must have been like. Of their color effect we may only guess.

The history of Greek painting may be divided broadly into two periods: first, the early period including the beginnings of historical painting, through the period of Polygnotos and his contemporaries, when the really historical and monumental mural paintings were carried to their majestic development. The grand tendency of this work could not have been confined to wooden panels sunk into the walls, but it must have been executed directly on the wall itself.

In the second period, mural painting proper was supplanted by easel painting, characterized by the perfection of technique, but also by the degeneration of grandeur and nobility of purpose.

Easel paintings do not seem to have occupied the genius of the greatest painters before the 4th century, that is, after the greatest masterpieces of architecture had already been erected and their walls decorated.

The discussion between Hittorff and Raoul-Rochette, and their adherents, concerning the extent of mural painting in the best epoch of Greek art, shows us the great importance of distinguishing between paintings executed on the wall (mural paintings), and those executed in the studio (easel paintings); and this distinction is especially important to the architect.

Mural paintings especially if executed in fresco, are limited to a broad treatment, and a fine finish is only achieved with difficulty. They are not intended to be examined so closely as the small easel pictures, and hence more attention may be given

to the general effect than to the exhibition of technical skill. Paintings made directly on the wall, they are intended to decorate, may the more easily be made to harmonize with the surroundings and become homogeneous with the architecture, than those executed at a remote place in a studio where the artist is not so much influenced by the architectural environment, that will eventually surround his picture. Hence, the importance to the architect of the distinction between these two classes of paintings. It is inevitable that the former class will serve better to enhance the effect of his structure and to interpret his ideas, than will the latter class. The painter is best inspired to coordination, when he works on the very wall itself.

On the other hand, paintings done in the studio are best suited to the highest development of an independent art. There in the studio, the artist may work at his leisure, and as inspiration may come to him; he may study from all the models he needs, and may spend more time over the study of details. He is principally concerned with painting a picture, and being removed from the influence of the limitations proposed by architectural forms, he may attain to greater heights of freedom and expression. However, when his painting is put in place, the surroundings may fail to coordinate in producing the exact effect the artist intended.

It seems very absurd to us today that the argument should have centered so long around the question of the material on which the mural paintings were executed, whether on wooden tablets set into the walls or applied directly to the plastered surface of the wall. No remains of wooden panels have come down to us, so that we cannot arrive at any conclusions in regard to them. Doubtless,

they were used to some extent, but it is not probable that the masterpieces of painting were executed on this material. Because of the wholesale transportation of the Grecian paintings to Rome, it would seem that they must have been of a portable nature and could easily be removed from the walls. Yet the immense cost of transportation could not be accounted for, if this were true. Hittorff says that the works of the immortal artists, which covered the temples of Greece could be stripped off with difficulty from the walls, which were of brick, and perhaps never from the sanctuaries of marble or stone. (Architecture Polychrome, p. 219 & ff).

B. Materials on which Paintings were Made

The fresco paintings were, of course, made directly on the stucco surfaces. Distemper paintings were not only executed on plastered walls but also on "whitened wood tablets". Canvas was not used until in the late period, as in the mummy paintings of Egypt under the Empire.

Votive tablets were executed on plates of terra cotta or stone slabs, sometimes of great dimensions. Four paintings on prepared stucco slabs were found at Stabiae; doubtless these stucco slabs were most common for paintings made to order and for the decoration of a particular place. (Semper, Der Stil, Vol. I, Sec.81). Grave steles of stone or marble sometimes had portraits painted on them. Four marble slabs found at Herculaneum were adorned by outline drawings in red, and they had probably been painted in encaustic, which the heat of the lava had destroyed. Paintings on slabs of slate have been found in Etruscan tombs. Those on the sarcaphagus at Cornetŭs were executed in encaustic on alabaster.

C. Colors

Pliny notes that certain of the great painters used only four colors: white Melian earth, yellow or Athenian ochre, red from Sinope of which there are three varieties, and black. But we know that other colors were used, although there can be no doubt that the earlier painters were so limited. "Coeruleum" or blue was used later, and we have no occasion to doubt that the Greek artists finally obtained a full mastery over color technique, and that they were acquainted with a sufficient number of colors to produce any effect they might desire.

D. Historical Development

No ancient writer has left us a satisfactory and complete account of the history of painting. Pliny's Chapters on Art are very incomplete, and show that he was not well informed on what he was writing about. Pausanias has left us fairly complete descriptions of the buildings of Greece, as he observed them in the second century of our era, but his knowledge of historical facts was quite defective. The Greeks themselves had but a traditional idea of their early history, and they were inclined to emphasize traditions, which would add to their glory, regardless of all truth. (Curtins, Greek History).

Of the earliest mural paintings on Grecian soil, we have examples of the frescoes of Knossos, Tiryns and Mycenae with their characteristic intense feeling for life, as we have already mentioned.

The beginnings of painting are lost in remote antiquity, but it was the opinion among the ancients, that outline drawing was first invented and that filling in these with color followed.

Cleanthes of Corinth was said to have first practiced outline drawings; Telephanes of Sicyon first represented details within the pure outlines; Ekphantos of Corinth introduced the filling of the outline by color. Eumares of Athens (date unknown) was the one, "who first distinguished male from female". It is probable that the distinction he made was similar to the convention found on the black figured vases where white was used to represent the flesh of women.

Cimon of Cleonae (about 520, 500 B. C.) was said to have made great improvements upon Eumares inventions, that he discovered foreshortening and variations of expression such as faces looking up, down, or backwards. He was also said to have brought out the anatomy of the limbs and discovered the way to reproduce the folds of the garments. Portraiture was not practiced until in 470 B. C., when Panaenos used it in his painting of the Battle of Marathon.

The great paintings of the early period (550-480 B. C.) were probably outline drawings with washes of color, as we may judge from some fragments found at Athens. One from the tombstone of Lyseas shows a figure, painted in tempera on marble, holding a wine cup and a lustral branch; the ground is red, and the figure is clad in a purple tunic and white mantle with colored border; the branch is green, the cup black. Another is a painted votive tablet of terra cotta; the drawing is in black lines on a creamy ground, within a frame of black and purple lines; the nude parts of the warrior are brown, the drapery and patterns on his armor are black, and the inscriptions and various details are purple. This perhaps gives the best idea of the condition of painting in Athens at that time. (For illustrations of these two fragments see Plate LXII,

from the Sack of Troy and a Vision of Hades,- fully described by Pausanias. The figures were arranged in bands, but in several series above each other, without any regular background or foreground; each group was distinct and each figure was inscribed with its name. The lack of picturesque unity was compensated by artistic subdivision. "A kind of composition, that seemed intended for successive observation and enjoyment of the art work, just as a similar method, even if already with a deeper mastery of the problem, was proposed in the Parthenon frieze". (Lübke-Semran's Kunstgeschichte, Grecian painting, Historical Development). The drawings were flat, without any attempt at perspective or modeling, and we are told that the artist was limited to four colors, black, white, red and yellow, as basal colors, green and a certain kind of blue as mixed colors. Mastery of technical processes did not come until a century later.

The real achievement of Polygnotos was to separate art from mere handicrafts and to mark the epoch, at which painting as an independent art may be said to begin. He was said, by an ancient writer, to have "invented painting". He was famed for his clear, rhythmic composition, delicacy of drawing, together with expression and nobility of form. Individuality or "Ethos" was the chief characteristic attributed to him before all others. Aristotle said that "he painted men greater than they were". Not action, but dignity of attitude and expression, lent to his art a relief rather than a pictorial style. Thus his works were suited to great monumental purposes, severe and simple, allied in treatment to the early mediaeval Christian paintings, but far surpassing them in delicate drawing. The epic character was uppermost in both.

Walter's Art of the Greeks).

For the vacancy, which now occurs in early Greek frescoes, we must turn to the tomb paintings of Etruria. (See Pl. LXIII, Walter's Art of the Greeks).

Previous to the 5th century B. C., we know little of mural painting on Grecian soil. Polygnotos, a native of the island of Thasos, was summoned to Athens by Cimon, about 474 or 462 B. C., for the purpose of adorning a number of the more beautiful edifices with paintings. He decorated the Portico Poihile (many colored) with some historical paintings, the distribution of which Pansanias gives as follows:

First wall: first picture, Battle array of the Athenians at Oenoë; second picture, Beginning of the battle; third picture, Battle array of the Spartans.

Second wall: first picture, Battle of the Amazons; second picture, Fall of Troy; third picture, Kings around Ajax and Cassandra.

Third wall: first picture, Battle of Marathon, the Plateans and Athenians in battle array against the barbarians; second picture, Flight of the barbarians; third picture, Battle and defeat at the ships. The last three paintings were separated by four heroes and gods not directly concerned with the subject. The paintings on the other walls were certainly separated separated in like manner. (Pansanias, Bk I, Ch. 15).

Polygnotos also contributed paintings to the temple of Theseus, the Pinacotheca of the Propylaca, etc. ; but his chief work, which brought him the greatest fame, was the decoration of the Lesche or Assembly Room at Delphi. The subjects are taken

The results of modern research in relation to the art of Polygnotos seem to prove, that these paintings must have been entirely conceived as decorations of the surfaces of the walls. That is, as mural painting proper. They were about 16.4 feet high and the figures were life-size. The ground was white, and it was usually represented by wavy lines giving the effect of the slope of a hill, and over this hilly background the figures were distributed as uniformly as possible (Lübke-Semrau's Kunstgeschichte). The effect of these paintings has been compared to that of rich mural tapestries.

Two other artists associated with Polygnotos in the Attic school were Micon and Panaenos. The former was famed principally for his paintings in the temple of Theseus, of which Pansanias wrote: "Near the Gymnasium is the temple of Theseus, at which are pictures representing the Athenians fighting the Amazons; ... and there is also painted in the temple of Theseus the battle of the Centaurs and Lapithae".

Panaenos decorated the rails and sides of the throne of the Zeus of Phidias at Olympia. It seems that his style must have been similar to that of Polygnotos.

Apollodorus, who followed soon after Polygnotos, was regarded by Pliny as the highest representative of Greek painting. He is said to have been the first to introduce effects of light and shade, and gradations of color, so that he was nick-named the "shadow-painter". His pictures were characterized by organic unity, a new thing in painting.

Agatharcos, a contemporary of Apollodorus, was noted chiefly as a scene painter for Aeschylus, and it is possible that he used

perspective effects. Painting now became freed from the "sculpturesque".

In the 4th century, there were many artists, whose names have been handed down to us. In the early part of the century Zeuxis and Parhassios were foremost: the merit of their school was in its richer and more refined color, a more finished modeling, and the attainment of a more positive effect of illusion.

In this century architecture, which was declining towards the decadence, no longer called for the artist's chief efforts, and his attention was now devoted to easel painting and domestic art, instead of to monumental fresco. The development of painting as an independent art was now free to attain its highest achievements.

But in this period are two artists of special interest to us: Pausias, of the Sicyon school; and Nicias of the Attic school. The former was a born decorator, and he also had more fancy than the others. He was especially skilled in encaustic work, and devoted his talent to the decorations of walls and ceilings. Nicias was also famed for his skill in encaustic, and was employed by Praxiteles, the sculptor, to color statues. The school to which Nicias belonged revived the grand and decorative style of the preceding century, adding to it advanced technical skill. Pansanias, speaking of a tomb near Tritea in Achaia, said: "Before entering the city we see a monument of white marble, remarkable in other respects but principally for the paintings, the work of Nicias, which are on this tomb. We see there a woman, young and beautiful, seated on an ivory chair; before her is a servant holding a parasol; and a young man, still beardless, standing clothed in a tunic with a mantle thrown over it; near him is a slave bearing javelins and

and leading the dogs for the chase". (Bk. VII, Ch. 22).

At the end of the 4th century, the most famous artist was Apelles, regarded by contemporary Greeks as their greatest painter. The charm of his work seems to have been in the subtelty of colors and nobility of conception. He was court painter to Alexander the Great and was the only one allowed to paint the portrait of the conqueror.

In the age following Alexander, realism was carried to an extreme. Genre pictures, still life, and the so-called "rhyparography" or trash painting prevailed. The execution was wonderfully delicate, but they mark a decided degeneration of public taste.

E. The Technique of Mural Paintings

Three processes of painting were practiced by the Greeks,- fresco, distemper and encaustic.

Fresco was in general use among the early Greeks; it seems to have been one of the traditions common to all antiquity, like the use of stucco. True fresco is executed directly on the wall while the plaster is still wet, and hence the necessity of rapid execution and the use of few colors. The painting is done in water colors mixed with lime, and as the plaster sets, the colors become fixed and are of great durability. If the plaster is too dry when the colors are applied, they will scale off later. Thus the fresco method is detected at Pompeii, because the paintings executed in wet plaster are well preserved, and others, completed after the plaster began to dry, have disappeared.

Painstaking investigations by Otto Donner (See Man's Pompeii) show, that most of the Pompeian paintings were executed in

fresco. The decorative borders were painted rapidly, then a square or round area was cut out in the plaster and filled with fresh stucco on which the picture was painted.

Distemper, or tempera painting was done on a dry surface, on which the artist could work leisurely. He could use a greater variety of colors and give more attention to the finish, but the work was not so durable as the fresco. The colors required a vehicle that would cause them to adhere to the material on which they were applied, and this vehicle seems to have been gum tragacanth, size, or the yolks or whites of eggs. (The Builder, 1844, p. 539). The tempera process did not necessarily require a plastered ground but could be executed on a variety of surfaces and materials.

The encaustic method, common among the Greeks, required wax as an ingredient and the colors were fixed by heat. A great brilliancy of color together with durability are the advantages of this method. Paintings which were subjected to the weather were usually executed in this manner. There seems to have been three kinds of encaustic: (See Article on Mural Painting, by J. Jollivet, in Revue de L'Architecture et des Travaux Publics, Vol. VIII, p. 242 & ff.) one in wax; another by means of a cestrum (a metal instrument used to fix the colors), on ivory; and a third, which consisted in spreading on with a brush some wax melted by heat. The first alone seems to have had any connection with painting proper; the second was doubtless a sort of engraving on ivory, where the lines were sunk with the red hot point of the cestrum and may have been filled with wax colors; the latter was used for covering ships, and probably all objects to be protected from the weather.

F. Mural Paintings found outside of Greece

Great numbers of mural paintings have come down to us, but they are mostly on Italian soil. They are important, however, because they breathe the true Hellenic spirit and reflect Hellenic art from the earliest period down through the decadence.

In Etruria have been brought to light a multitude of remains in the tombs, showing an unbroken line of development, and therefore, highly important. In the Grotta Campana at Veii, the paintings recall the style and subjects of the early Greek vases of Oriental influence. The drawing is very childish; the coloring harmonious, but is quite arbitrary, in brown, red and yellow. They chiefly belong to the 6th century. Some show more Greek influence, while in others the native Etruscan element predominates, especially in the earlier realistic pictures. Later examples show more of the Greek idealism.

In the tombs at Corneto, the colors are more various and fanciful,- for instance trees are sometimes shown with blue green leaves and red stems. The drawing is archaic, but is spirited. There are also some later paintings in the style of Polygnotos.

The fullest freedom of art in Etruria came in the 3rd century B. C., some time after the climax of painting in Greece. Monotony of subjects is combined with variety of style.

In 1849, the Archaeologist Braun wrote from Rome: "At Coere-Agylla had been found a mural painting, which ought to be classed among the most interesting remains of this branch of art. The style is ancient and not without a certain grandeur of conception. But what renders this monument so very remarkable is its technical execution..... The monochrome paintings are not painted,

as elsewhere, on a coat covering the wall, but on tablets of terra cotta."

Besides the mural paintings found in the Etruscan tombs, there were also paintings on slabs of slate.

A large alabaster sarcophagus, found in a tomb at Corneto in 1869, shows paintings on four faces representing a fight of the Amazons. The figures on the sides are on a lilac ground,- those at the two ends on a black ground. "The colors are simple, but brilliant and of an enchanting harmony." The date of this tomb may be placed in the 3rd century B. C.; no doubt, it is an Etruscan work, but it was strongly influenced by Greek feeling. (Woltmann and Woermainn, History of Ancient Painting, p. 101).

In lower Italy where there was a true Hellenic life, and especially at Paestrum, there are remains of mural paintings marked by Greek grace and repose. The best of these may certainly be considered as copies of Greek originals. The subjects are varied, the scenes are simple but are depicted in lively colors on a white ground. In Campania, the garden walls of the villas were frequently decorated by landscape paintings.

The mural paintings at Rome belong almost exclusively to the last days of the Republic and to the Empire; they only illustrate the completely Hellenized period of Roman art. The Roman wall paintings were not works of famous artists, but were examples of a flourishing art industry. We may well question what the works of the great masters must have been like. (Woltmann and Woermann's History of Ancient Painting).

Recent excavations in the gardens of the Farnesina Palace have brought to light painted decorations far surpassing anything

hitherto found at Rome. The walls of the corridor are divided by greenish pilasters, and in the panels between them are traces of delicate figures and landscapes on a white ground. In the chambers are paintings of extraordinary beauty on bright red grounds. A larger hall has landscape pictures separated by a fanciful architecture of slender columns and festoons.

The famous "Odyssey landscapes" were once a part of the homogeneous scheme of decoration around the lower part of a wall, as a dado, and divided by pilasters painted bright red. The predominating colors are yellowish brown and greenish blue. The conception of nature is entirely decorative; the figures are identified by inscriptions, as in the style of Polygnotos.

The "Aldobrandini Marriage", one of the best known paintings of this period, is full of dignity and spiritual grace,- quite decorative in its frieze-like composition.

The discoveries at Pompeii and Herculaneum have added very materially to our knowledge of mural painting among the ancients, although the works illustrated there were executed principally by artisans and represent an impure Grecian style. In about 3,500 paintings found at Pompeii, there is no evidence of a progressive development either in composition or technique. (Mau, Pompeii, p. 461). The differences consist mainly in the technical handling and the color schemes. The painter was an eclectic, who borrowed from the creations of the past as suited to his fancy, contenting himself with sometimes copying or imitating entire compositions, or again taking single motives, which seemed to answer his purpose. The general preference was for paintings of the Hellenistic age after the death of Alexander, yet examples of earlier styles are found.

The hanging of pictures upon walls does not seem to have been in vogue in Pompeii, at least during the period to which the remains belong. The system of decoration left no room for framed pictures, and no traces of such have been discovered. By this we do not mean that easel picture were not painted, but they were let into the wall and became a part of the general scheme of decoration. Not merely small groups or single figures and portraits were introduced into the design, but also large compositions, the latter forming the principal motive around which the other ornamentation became the enclosure.

The Pompeian paintings consist of four general classes,- mythological, genre, landscape and still life paintings. The largest and most important paintings are mythological, and they usually breath the spirit of Greek repose and grace. They sometimes appear to be the works of real artists. The landscapes are numerous and are of various sizes; sometimes they cover the garden walls, or occupy the principal panel of an internal wall. The majority are very small and are introduced into the accessory parts of the decoration; the colors are few and soft.

The system of mural decoration in Pompeii is worthy of mention, although we must not attribute too much of it to Grecian influence. It appears,like their architecture, to break away from the ancient ideas. The decorative style of the Tufa Period (2nd Cent. B. C.) is known as the "Incrustation" style. The colors are well preserved on the stucco ground and are intended to imitate colored marble veneering. Wall paintings are lacking, but pictures are formed in the mosaic pavements. The dado is usually treated as a separate member with a smooth surface and it is

painted in bright colors, usually yellow. The painted imitations of marble blocks above the dado are modeled in slight relief and are painted in plain masses of various colors,- black, red, yellow, magenta, etc., separated by narrow white bands. This style must have been carried out in real marble at one time, probably after the conquests of Alexander, when a taste for luxurious and costly materials was developed. Remains similar to those in Pompeii have been found at Pergamon and Priene.

About 80 B. C., a new style of wall decoration, known as the "Architectural" style made its appearance at Pompeii and lasted throughout that century. The wall is still divided into three wide bands,- dado and cornice with the intervening wall space. But the wall space is no longer plain and the cornice presents a great variety of motives. The upper divisions tend to become an open space and is often painted blue, small architectural designs being sometimes painted there, as if seen in the distance. The principal motive is the elaborate frame work enclosing the painting of greatest interest, which now had its place in the scheme of decoration. The use of architectural forms enclosing the painting gives evidence of a reminiscence of the ancient style of mural painting, when it was a part of the architectural scheme. The architectural members are not impossible, they appear capable of sustaining actual weight.

The "Ornate" style prevailed until about the middle of the 1st century, A. D. Its characteristic was the free use of ornament. The architectural forms used in the decoration lose all their significance, and become mere ornament. Egyptian ornamental forms are also introduced. The effect of this style is pleasing,

but the free use of neutral colors gives the walls a somewhat cold appearance.

The latest style, called the "Intricate", in vogue at the time of the destruction of the city. The use of intricate architectural forms and of perspective effects gave free scope to the imagination of the designer, until the fundamental conception of the system is lost to view. The importance of the principal painting is obscured by the elaboration of the enclosure. Single floating figures and groups of statuary are the favorite painted decorations.

The fondness for brilliant colors seems to have prevailed throughout the Pompeian period. The principal colors were red from Sinope, blue or ceruleum, yellow ochre, black, white and a brilliant green. Black and white were much used for grounds, from which the decorations in gay colors stood out strongly. The red, known as Pompeian, was used in large areas, especially for panels in the middle division of the walls. Representations of color were usually painted yellow, never white.

The color effect seems to have produced a rich harmony and to have added life to the poorly lighted rooms.

SECTION X.

The Minor Art of Vase Painting, and its Relation to the Major Arts.

Thousands of specimens of painted vases have been preserved for us and they are of special interest, because of the light they seem to throw on the arts of painting, sculpture, and even architecture. The skillful composition and exquisite draftsmanship of the best of these vases make them worthy of study for their own sake.

The earliest vases of Mycenean origin show simple, straight line ornaments covering the entire surfaces indiscrimianately. Soon there are circular patterns and curves, with spirals taken from the lower forms of animal life, which so delighted the heart of the Mycenean artist, and which are found on the jewelry, carved stone or painted frescoes. The spiral ornament of the ceiling of the tomb chamber at Orchomenos is found on the vases of the period.

The "Dipylon" vases represent those expressing earliest independent Hellenic spirit. The decorations are chiefly men and horses, arranged in processions in horizontal bands, separated by straight line geometrical figures. The backgrounds are filled with dots and crosses, and the top is furnished with a double meander. The drawing is extremely rude, but painstaking.

In the Homeric age, the pottery shows unmistakable signs of Oriental influence. The decoration are in bands of conventionalized animal and vegetable forms; the Asiatic lion and tiger are introduced, together with the palmetto ornament. The spaces are all filled with rosettes and crosses, influenced probably by the

Assyrian textiles. The color of the clay is light yellow with ornaments in dark brown and details accented in white and violet, with an occasional touch of strong red. The effect is generally harmonious. Human figures are scarce on these vases.

In a class by themselves are the vases found in the Greek tombs of Cyprus, undoubtedly of Greek manufacture. They are known as the Samion ware and are a bright red or black, very lustrous, generally without ornament. The decorations, when they occur, consist of zig-zag lines and simple geometric patterns incised deeply in the clay, then filled in with a white substance.

The black figured or strong style is that of the first historic period, in which the art of vase painting is very highly developed. The figure compositions are simple and full of meaning, and the use of ornament merely for a filling is abandoned. The figures are well drawn, but retain their severe immobility and the exaggerated characteristics of the Archaic period of Grecian art, although this style is contemporary in part with Polygnotos. The bands of ornament are refined and well drawn, like those applied to architecture, such as the recurved leaf form used on the crow's-beak moulding, the heart leaf and the honeysuckle, also the egg and dart moulding with the eggs alternately light and dark.

The arrangement of the decorations on these vases is interesting, and it is undoubtedly similar to that of mural painting. Sometimes there is a single frieze of figures comprising only one group; or there are several groups separated from each other by an ornament. Besides the principal composition, there were sometimes one or more narrow bands of figures, either human or animal, of merely general interest, placed at the base, around

the neck, or separated from the other band of figures by a line. The François vase, the most valuable specimen of this style, showes five bands of figures besides a much narrower band on the base. The widest and most important band occupies the shoulder of the vase, two bands of diminishing widths are placed alone and below. There are also figures on the handles. The compositions are full of action and interest; the figures are distinguished by inscriptions, after the custom in mural painting. What interests us most on this vase is the representation of the facade of a Doric temple, the shafts of the columns, triglyphs, and architrave are represented in black, and the base, capitals, metopes and cornice are white. Were these parts represented thus because the painter was accustomed to see them actually differentiated by color, or was this simply a method of pictorial representation?

The subjects of the black figured vases are mainly mythological, like the grand mural paintings of the same period. In fact, the François vase has been called a miniature of Grecian mythology.

The clay of these vases was usually deep red, varying to cream color and a bright orange. The figures are in shinning black on a glazed ground with details of white and purple. White was also used on the flesh surfaces of the women to distinguish them from men.

The red figured style was introduced as early as the beginning of the 5th century but it did not completely supercede the black figured ware until about the end of the century. The new style was a bold and ingenious invention, the exact opposite of the preceding style in that the background, instead of the

figures, was painted black, the figures being left in the ground color of the clay, usually a deep red. The design was drawn with a fine pointed tool, and the black varnish filled in around these lines. The minor details, such as features and folds of drapery were added in fine black lines; further details were expressed in a thin brown wash, or by white or purple; sometimes bright red was used, as for blood streaming from the wounded.

Archaism lingered for a while in the red figured vases, finally disappearing entirely. The figures are refined without loss of dignity, and in the later years there is a return to the grand mythological subjects, that had been replaced for a time by genre subjects. The influence of Polygnotos is plainly seen in many of these vases, and from them we may gain some faint idea of the simple grandeur of his style. The arrangement of figures in several tiers seems not to have been quite so popular in this style as in the preceding.

A return to the black figured style is seen in the vases which are covered with black, except on the shoulder, where a red space is left and the figures are painted in black. The effect is that of a separate figure attached to the surface and without organic connection with the vase. "As a detached and enclosed painting, it naturally accords with the conditions of a composition more in relief, rather like the metopes in temple architecture." (Lubke-Semran's Kunstgeschichte)

Contemporary with the red figured vases were those of the polychrome style. They are especially interesting to us because their colors have been well protected by the wax coating, and they doubtless "present positive analogies to the prevailing

polychromy of the time to which they belong". (Semper-Der Stil-Vol I Sec. 80) The ground of these paintings was usually white, although sometimes black. The figures are drawn in red or black outlines, partly filled by washes of color, chiefly red, purple or brown, but sometimes blue and green with yellow for the hair. Gilding is used to touch up details, especially the hair just as it was used in sculpture.

These polychrome vases, if we may judge from the remains, presented a very harmonious color effect. (See Hittorff, Arch. Polychrome. Plate XV) The colors and the white ground was no doubt softened and harmonized by the application of the protective coating of wax. We may get some idea of the quality of the coloring which these vases suggest. Architectural settings are sometimes introduced into these compositions, and the ornamental details reproduce both in form and color those found on the monuments of architecture.

Toilet vases were sometimes decorated in low relief by figures painted in various colors. An interesting example, representing the marriage of Bacchus and Ariadne (illustrated on Plate XIV. Fig. I, Hittorff's Arch. Poly.), throws some light on polychrome sculpture.

The newly perfected skill in drawing soon brought about rapid decadence in the art of vase painting, so that it disappeared entirely in the Alexandrian period.

There can be no doubt that vase painting followed quite closely the ideals of mural painting and sculpture. Frequently the vase paintings were copies of celebrated works, and they give us an accurate idea of the latter. It is not difficult to conceive

of the application of some vase paintings to the wall without any discredit to the latter. The subjects are eminently suited to mural painting, the Francois vase especially suggests an architectural feeling in its well proportioned bands. At the same time, the"sculpturesque" element is uppermost in the compositions and prove to us how closely the arts of Greece were related to the elements of relief, but that element is not lacking in color. There is a close analogy between these compositions and those which filled the pediments of the temples, in their adaptation to the spaces they occupy; and their enclosure by ornamented bands corresponds to the carved and painted mouldings surrounding the pediment. We have already mentioned the analogy between isolated compositions on the red shoulder of the black vases, and the sculptures of the metopes. Other compositions are similar in effect to the long friezes of the Parthenon, or taking an example on a smaller scale, to the rows of figures sculptured in relief on the drums of the Ionic columns of the temple at Ephesos.

The covering of large surfaces of draperies on both black-figured and red-figured vases with either white or violet, may be considered analogous to the painting of large surfaces of draperies on the sculptures; and at other times the accenting of details prevailed in both phases of art.

The analogies between vase painting and the major arts should not be carried too far, especially in the representation of architectural details represented on the vases. Hittorff has assumed a close analogy between vase painting and architectural painting, and he has restored certain details according to suggestions found on vases, for instance, the decoration of a

Doric capital inspired by that on a vase painting. (See Plate XXI Millingen's Ancient Unedited Monuments, and Hittorff & Zanth's, Arch. Ant de la Sicile, Plate 85. Fig. 4). The restoration, in our opinion, does not seem well founded.

SECTION XI.

The System of Grecian Polychromy.

Now that we have passed in review all the available facts concerning the use of color on Grecian architecture, we are not privileged to inquire into the principles and to determine, if possible, what the actual effect of these polychrome monuments must have been when existing in all their pristine splendor. The mere statement, that the triglyphs were blue or that vestiges of red and green have been found on a certain moulding, are meaningless in themselves. It was the assemblage of all the parts "fitly joined together" that produced the harmonious whole in color as well as in form.

Whether the Grecian temple crowned the summit of the sunny hill, like the Parthenon at Athens, or was set against the background of the sacred mountain and surrounded by the consecrated grove, the color was applied with the same judicious care, and we are no longer permitted to reconstruct mentally, these ancient edifices as dazzling masses of whiteness. Whatever their reasons may have been, certain it is that the ancient Greeks felt the need of color to give sparkling life to their constructions, and their fine sense of fitness certainly would have revolted against great masses of white in the landscape. They revelled in color as a joy of life, and we may assume real pleasure in the color itself as the chief controlling motive for its use. Unlike the Egyptians, they did not apply it so indiscriminately without any regard to the meaning of the object thus ornamented, but exercised a proper self restraint in the distribution of the color.

General Surfaces:- Wether or not color was applied to all surfaces of ancient Grecian architecture, we cannot decide positively. The remains of stucco-coated monuments, especially those in Sicily, seem to prove that a general color of yellow was applied to all surfaces not otherwise decorated. Travelers in Greece almost all state that the fragments of marble are covered with a golden yellow tone. It has been disputed at great length, whether the golden yellow tone was a part of the original color scheme or is merely the result of time, sunlight, or the presence of iron in the stone. Durm states that it must have been due to the presence of a lichen on the surface. (Baukent der Griechen, 3rd Ed. Chap. 6) Beule noted that white Pentelican marble becomes covered with a natural yellow coating almost immediately, when a chip is broken off. If this were the case, it would not have been necessary to color the marble surfaces, for when the building was completed and ready for the colored decorations, nature would have contributed substantially toward this. It is very probable, however,-and this is the opinion generally shared by the best authorities, that the white marble surfaces were covered with a transparent tint that softened the whiteness and rendered it more agreeable to the eye, yet without destroying the pleasing texture of the marble. We quote from Penrose, who only expresses the general opinion: "It would be unreasonable to suppose that the ancients entirely concealed, or even materially altered in appearance, the general surfaces of the marble which they made a great point of obtaining whenever possible; but no one who has witnessed the painfully dazzling effect of fresh Pentelic marble under an Athenian sun will deny the artistic value of toning down the

almost pure white of its polished surface, and the more so when considerable portions of the architecture were painted in strong and positive colors. We need not suppose this tone to have produced more than the difference between fresh white marble and ivory." (Penrose, Principles of Athenian Arch.-Note p. 55.)

We may therefore believe that the adoption of marble as a building material did not produce any radical change in the polychrome system. It may have been that large white surfaces were left untinted in the late Roman period, when luxurious and costly materials were more sought than real art. When large colored surfaces were desired, the Imperial Roman school used colored marbles, when they had at command a great variety. In the days of Nero, the Romans painted the stone surfaces in imitation of colored marbles with all their veinings. This was the system of mural decoration in vogue in Pompeii known as the "Incrustation" style.

The use of different materials in one building, such as a marble entablature or facade of a stone structure coated with stucco, demanded the harmonizing agency of color to produce unity. When the Greeks had been so long accustomed to seeing all the surfaces tined, as in the stucco covered buildings, it is not likely that they would suddenly desire to change this system, merely because they had found a new material.

Columns:- In the early period, as at the ancient temple of Corinth in the 7th century, the columns were coated with red stucco and were probably relieved against a wall of a different color or one of the same color, which is more probable, on which were some paintings in a few simple tones. We have no mention of

any red columns in Sicily, or in fact of those of any color, except yellow, which seems to have predominated in Sicilian architecture, probably because it was more easily obtained than red. It is only in the most ancient monuments of Greece that we find red columns, all the others are yellow in varying intensity. Semper it is true, mentions a warm brick red on all the columns and general surfaces of the Temple of Theseus, but this statement does not seem to be corroborated by any other writer; others have mentioned a deep ochreous tinge, which may, however, have approached a reddish hue.

Doric columns were not ornamented by any painted decorations: the arrises seem to have been quite sufficient for the desired effect. Some remains of red on the columns of the Palestra at Olympia make it probable that the lower half of the columns were painted this color. In general, however, the shaft rose in strong vertical lines undisturbed by any zones of color. The annulets of the neck were frequently marked by red, and possibly sometimes by gold, but these would not at all distrub the effect of the column, serving only as an approach to the change from the long lines of the shaft to the abrupt curve of the echinus.

The shafts of Ionic columns were generally like those of the Doric, the sculptured drums from Ephesos being unusual.

Capitals:- The echinus of the Doric capital seems to offer an excellent place for painted or sculptured ornament, which would serve to emphasize the function of this member, but in general, we must believe that the Greeks showed a remarkable self restraint in this. The echinus was not always decorated; the

graceful and refined curve would seem worthy of accent, yet must have frequently been left plain, at least we are not authorized to say that it was always decorated. It is not improbable that the echinus was painted a solid color, differing from that of the shaft or was even gilded. Laloux asserts that there was undoubted evidence of a painted decoration on the capitals of the Temple of Zeus at Olympia, but according to Graef, none of the capitals showed any trace of either color or ornament. As Laloux' ideas seem to be less conservative than some others, we should not be too hasty in accepting his conclusions. Semper and Hittorff, however, agreed in the opinion, that the Doric capitals, both the abacus and echinus, were ornamented by painting. Hittorff derives his conclusions from vase paintings and not from actual remains.

The Ionic capital, however, may be safely assumed as enriched with color, although the few remains make it difficult to lay down any positive rules. The fillets of the volutes were generally red, the eyes were encrusted with enamels or inlaid with semi precious stones. The ground of the volutes may have been blue; the eggs of the abacus were probably colored in red and gold on a blue ground; the scales on the balusters sides were painted, and the astrigals were red. The necking was probably decorated by color as well as by relief ornament; the upper members had a painted or carved and painted foliage decoration.

Concerning the color treatment of the Corinthian capitals we cannot lay down any general rules as we have data concerning only the one from the entrance to the Stadion at Olympia, previously mentioned.

Antae Capitals:- The antae capital was a special feature in the decoration. It differed from the capital of the column, a characteristic feature of the Grecian orders, and its color treatment was not analogous to that of the column capital. The bird's-beak moulding, the principal member of the Doric antae, was ornamented by the usual vertical leaf form, alternately red and blue or red and green with gold lines. The upper moulding was ornamented by eggs on which green, red, blue, yellow and gold were variously used. The projection of the upper facia was marked by a red soffit. (Penrose has restored an antae capital of the Propylaea with a deep green cove~~l~~to and two gold bands.)

The Ionic antae capitals received a similar treatment. The upper mouldings had colored egg ornaments. On the necking of some antae capitals at the Palestra, Graef found green scrolls and yellowish red flowers on a deep blue ground.

We have no data for the Corinthian antae capitals, but they were doubtless colored in part.

The Doric Entablature:- The severity of the Doric entablature was softened by the application of glowing colors in contrasting harmony.

The architrave was in the general tone of the building, although in early cases it was red, and was usually undecorated, except for inscriptions in bronze or gold letters, and the temporary decorations of shields and trophies. On some of the terra cotta fragments from Sicily, Hittorff noted some decorations on the architrave. The architrave band was usually painted red, or it was left white with a fret or meander in red. The regulas and drops were blue: the undersides of the drops were probably gilded,

and sometimes the regulas had painted ornaments. This was not an absolute rule, since at the Temple of Theseus the drops were red and the architrave band was blue.

The traditional color for the trighyples was blue, varying from a deep intense, to a light sky blue. In Sicily the channels were sometimes black. In early examples in Greece the entire triglyples were black but it is possible that this was merely a transformed blue.

There was a greater variety in the color of the metopes. On the Parthenon, they were red, elsewhere they were sometimes blue. In general the unsculptured metopes were left white, that is in the yellow tone of the general surface. In the early period the metopes were sometimes painted, as we know from those recently found in Arcadia at Thermon, where an early 6th century temple was discovered. Those metopes are of terra cotto with paintings in black, white, three shades of red, including purple, on a creamy white ground. The style is analogous to that of the Corinthian vases of the same period.

That the metopes had painted ornaments in the best period we have no actual proofs and restorations of such are founded purely on conjecture. Laloux assumes that the external metopes of the Temple of Zeus at Olympia were painted, because he found a circle inscribed on one of them. Hittorff found some faint traces of yellow and blue besides the red ground on the fragments of the metopes of the small Temple of Empedocles at Solenuintum, and as they had no sculptures, they may have been decorated by paintings.

The sculptures of the metopes frequently rose from a colored ground, and they were also decorated by glowing color, as

we have already noted. Large surfaces of the draperies contrasted with the color of the background. In the early period, the strongly colored sculptures, principally red and blue, were relieved on a white ground. Later in the best period, both the sculptures and the ground were colored. We are not informed as to the color of the ground, when only the details of the sculptures were painted, but it seems probable that they must have been relieved against a color. The effect of the sculptures of the metopes in bos-relief would be considerably heightened by the application of color.

The pediments generally had colored tympanums and corresponded in color to the metopes, when the latter were painted. Thus the tympanum and metopes of the Parthenon were red. The tympanum of the Temple of Theseus was a dark brownish red; at Egina it was blue, and this is the color most frequently found on this part. Blue was no doubt the best color for the place because of its retiring nature and would throw the sculptures out in strong-stronger relief. On the other hand, the dark red ground would serve better to absorb the shadows of the sculptures, which would be rather distracting, since the statues were executed in the round and not in relief. Choisy, indeed, attributes the use of colored grounds to this very reason.

The pediments were not alwasy decorated by sculpture. We have no actual proof that they were ornamented by paintings. The tympanums of the Erectheum show no sculptures, and the ground is uncolored. They may possibly have been decorated by paintings although no traces remain.

The Doric cornice always received colored ornaments.

The members were usually smooth and color was required to give them proper interest and variety. The mutules were, without exception, painted blue, like the triglyphs, varying from a blackish to a light blue. The intervals between the mutules were usually red, varying from a bright to a deep brownish red; at Olympia, they were sometimes uncolered. Frequently a palmette ornament in gold or yellow was on the soffit between the mutules, sometimes only at the corners. The band beneath the mutules was red, sometimes decorated by a fret. The guttae varied from a bright to a deep yellow, yellow is white or gold. In general they were red with gilded ends. The band above the triglyples was usually a deep blue.

The broad facis of the corona was not always decorated. In the earlier temples, as at Egina, it had a meander ornament on a green or red ground. The soffit of the valsing comice was red, like the background of the mutules. The large cyma separating the soffit from the tympanum was usually painted in the recurved leaf pattern as red and blue, with sometimes a touch of green.

The bird'sbeak moulding above the corona was always ornamented by a leaf pattern, red and yellow on a blue ground, or alternating green and red.

The cymatium was always ornamented. Sometimes by a honeysuckle motive, with a double palmette, or by an egg moulding, as on the central portico of the Propylaca, where the eggs were yellow on a blue ground with red darts. This member was frequently of terra cotta and it was either dark with light ornament or light with dark ornament, according to the period. (See Section on Terra Cottas) The lion's heads had the eyes and mouths red, though

sometimes the eyes were blue. It is possible that the heads were sometimes gilded, but we have no proofs of this.

Gilded bronze and other metals were introduced on the entablature to enhance the brilliancy of the effect.

The Ionic Entablature:- So few colors have actually been found on the Ionic entablature, that it is dangerous to attempt to formulate any rules; but we may accept it as probable that the soffits were red, the tympanums blue, and the background of the figured friezes blue, as in the richly colored frieze of the treasury of Cnidos at Delphi. The sculptured mouldings of the entablature were enhanced by guilding and colors. The ornaments of the cynatuims retain their outlines in some instances, proving that they must have once had some color, which has disappeared. (For the coloring of a fragment of an Ionic dentil cornice found at Olympia, see Curtius & Adler's Olympia. Plate 113. Fig.6. The facia has a yellow fret on a red ground enclosing yellow squares with blue and white checkers, the soffit is blue; the ogee above the facis had blue leaves with white veins and edges with red darts on a deep yellow ground, and a band of dark brownish red above.) The Ionic members were both sculptured and painted instead of being merely painted, as in the Doric order. Later they were merely carved and the painting omitted, as in the late Imperial period.

The Corinthian Entablature:- We may believe that these members also received color, especially the narrow mouldings. The sculptured parts of this order would not require so much color as the smooth Doric members.

The Decoration of the Porticoes:- The frieze was usually decorated by rich colors. The internal face of the architrave was frequently painted red. The mouldings and fillets received their due proportions of color, like the external members. Here the light was subdued, yet there was no appreciable change in the color system, so that this cannot be entirely atributed to the brilliant sunlight.

The ceilings were usually divided in panels. The beams were covered on the underside by painted interwoven bands, with recurved leaves on the echinus mouldings along their sides. The cap that crowned the wall of the cello and also extended above the frieze was decorated at the top by recurved colored leaves, its band having a golden fret. The grounds of the ceiling coffers was generally sky-blue with a large gilt star or honeysuckle ornament in each. (For examples of coffers from the ceiling of the Propylaea, see Penrose's Principles of Attunisn Architecture. Plate XXV.) The mouldings and bands separating the coffers were colored brightly in vermillion, dark green, blue, white and gold. The effect must have been rich, yet full of dignity and refinement.

The External Walls:- The external walls of the cello were generally colored, probably red or blue, or they were left white for paintings, such as Polygnotos executed there on a white ground. Semper thinks that the cello walls of the Temple of Theseus were blue. The dark dado, an inheritance from antiquity, was undoubtedly used on the external walls of the cello. The paintings were arranged in successive bands, as on the vases, and combined with architectural and conventional forms, they were

full of decorative value. It is possible that the compositions were arranged in panels in the later style but the character of the work of Polygmotos and his contemporaries seem to point to the use of a continuous picture, terminated only by architectural members.

Interior of the Temple:- The walls of the pronaos likewise received their share of colored ornament and mural paintings. Olive offernings of various sizes, kinds and richness, were arranged there. The intervals between the columns were filled by a bronze grille, admitting light and air. Proverbs were sometimes inscribed on the walls, as in the pronaos of the Temple of Delphi. In the middle of the wall was the colossal door of gilded bronze or wood inlaid with ivory.

The walls of the cella, which enclosed the stature of the god, were decorated by paintings. In the Temple of Zeus at Olympia, "the enclosing wall opposite the doorway was plain blue, while the other walls had paintings by Panaenos. There can be no doubt that mural paintings were applied to the walls of the cella.

The ceilings were flat and coffered as in the porticoes, or sloped with the roof. In the latter case the inner face of the roof tiles were sometimes decorated. Ancient writers have referred to certain chapels in Athens with gilded ceilings, alabaster ornamentation and magnificent inlays of gold and ivory. (Dwun Baukunst der Grischen, 3rd Ed. Chap. 6.)

The floors were in general covered by stucco and painted. Sometimes flag stones were laid with joints made so carefully, that we cannot believe they were covered. The mosaic pavements at Olympia were unusual, being not common in ancient Greece.

The development of the mosaic pavement seems to have resulted from the painted floors. Doubtless these in their turn were derived from the rugs of the Orient. (For fragments of painted stucco pavements found in Sicily see Architecture Polychrome Plate V. Figs. 1, 2, 3, 4, 5, 6, 7, 8, and 9. also see pp. 428-430 of the text.)

The Roof Covering:- In early times the roofs were covered with clay tiles, coated with stucco. Later, terra cotto tiles, elaborately decorated, sometimes on both surfaces were used. When marble came into general use as a building material, the roof tiles were of marble. Concerning the application of color to the latter, we have no data, but are safe in believing that they must have received a certain amount of color.

The Arrangement of the Offerings in the Temple:- "The offerings placed in the temples consisted of arms and trophies of war; images in precious metals adorned by paintings and carvings; the crowns, embroideries, and cameos, the necklaces of pearls and precious stones, the mantles of purple, the cups marvellously colored, vases and vials of gold or silver, probably used in the sacrifices, musical instruments, chairs, beds, coffers inlaid with precious metals, ivory, mother of pearl, etc; there were also altars, tripods, minors, garlands, branches of sacred trees, some animals in various materials; the statues of divinities, heroes, priests, athletes, princes, etc in marble, bronze, silver, gold, or ivory with some bas reliefs; paintings on wood or other substance: ex votos representing kings, or famous persons and consecrated by public gratitude, as well as private gifts; others

were masterpieces of art, intended at first to enhance religious faith and patriotism, executed by the most celebrated painters without any particular object other than to attract the attention of the devotees." (Arch. Aut. de la Sicile, Page 648-49.)

After the age of Pericles, movable paintings became great favorites as offerings. Gradually these paintings usurped the place of the usual paintings, which were omitted in the new buildings, or effaced by time in the old ones. In Greece, however, mural paintings were not entirely supplanted but continued to enjoy their honorable esteem.

The same marvellous harmony, which prevailed in the architecture of the Grecian temples and in their decoration, must have existed in the arrangement of the offerings.

It was customary to divide the walls of the cellas into three zones, the middle one decorated in mural paintings, the lower and upper ones being reserved for the offerings. (Arch. Aut. de la Sicile, Bk 9-Ch.10.)

As the most precious ornament, the statue of the god stood in a separate cell or in the open space enclosed by low railings, before the end wall of the middle aisle, its colossal dimensions often extending to the ceiling. Curtains generally concealed the precious statues, one in wool of Assyrian weaving and dyed with Phoenician purple concealed the chyselephantine statue of Zeus of Olympia.

The apparition of the supreme statue, gleaming in silver, gold, ivory, enamels and precious stones, and surrounded by all the art and beauty of which the Greeks could conceive, must have exercised an immense influence on the minds of the people.

SECTION XII

A Summary of the Principles

A. Colors

Pure colors were generally preferred to broken tones, especially in the best period of architecture. The colors were placed in strong opposition, usually being complimentaries, which must have produced a rich effect when softened by the atmosphere and blended by distance. It is this principle, that has revolutionized our modern system of color in painting.

The forms of the earlier architecture were more severe than later, and the severity of the color was in harmony with the forms. A combination of pink and mauve, for example, would have been quite inadequate to express properly the strength of the Doric entablature. Also, simplicity of parts demanded simplicity of color. In the early period the colors were few; later when there was a greater voluptuousness of form, a greater variety in color was permissable. More delicate forms required a sweeter harmony of color. Thus, we find the violent reds, blues and yellows tempered by the additions of violets and greens. In the later period, color was applied rather on broken surfaces than in large areas.

B. The Application of Colors

We have noted that the Grecian system of polychromy differed from the Egyptian in the application of the color applications.

The Greeks located color ornamentation on the excessory parts of the construction. "To the active members of the construct-

ionthe Greeks assigned not only a form stamped with their character, but a color which called to mind the solid material of which they were built." (Choisy, Histoire de L'Architecture, Vol.1, p.297) Thus the columns , the architrave, triglyphs, and the corona were , in the best examples, either covered with a solid color or left in the general yellow tone.

The details were treated with a care which surprises us. At th Parthenon, the under side of the cornices were ornamented by foliage, so fine that the eye could scarcely discern the drawing of it. The ornament was secondary and made subservient to the unity of the masses. The first impression should be that of a harmony of the parts. "The Greeks reserved for analysis the discovery of a world of accessories, which should awaken the idea of finish and perfection; in doing this they showed a sentiment as just as it was delicate, in the subordination which they succeeded in establishing between the masses and the details; some simple masses which imposed themselves upon the vision, some details which hid themselves from the first glance." (Choisy, Histoire de L'Architecture, Vol. 1, p. 297)

C. Mural Paintings

The character of the mural paintings was evidently such that the wall lost none of its meaning. At the same time, the painting was not the purely elementary style of the earlier periods, but it was an art worthy in itself.

D. Sculpture

Grecian sculpture, as well as architecture, throbbed with the joyousness of life which characterized all the activities of the Greeks.

The sculptures were not painted with an intention to deceive, but to add to the perfection of their form and to harmonize with their surroundings.

E. Conventionality of the System

The free development of Grecian art was never hindered by religious considerations, like the Egyptian. The priesthood imposed no dead conventionalities, that would destroy the life of art at its source. It is true that religion played an important part in the development of Grecian art, and we have noted how the growth of sculpture was at first slow lest the faith of the people be destroyed. But the desire for the perfection of art was uppermost, and in time overruled the religious sentiment without destroying it.

F. Variety

In our modern application of the orders we have neglected the fact that the Greeks did not build according to the rules and formulas laid down for us by Vignola. In no two buildings of the Greeks were the forms exactly the same; thus the echinus of the Doric capital often assumes several forms in the same building. The curves of the mouldings varied according to the taste of the architect.

We find this same principle of growth and variety in the application of color, a constant striving for perfection, which never reaches a formulated system. True, the triglyphs and mutules received traditional blue coatings, but this was an exception, and there was variety in tint even here, - the blue varying from blackish blue to a light cobalt. The soffits were almost always red, but the red was not always the same. The same mouldings

received similar ornaments, but there were subtle variations: in the egg moulding, we cannot say that the eggs were always blue on a red ground and the darts green; although practically the same colors were used on nearly all these mouldings, their relations varied. Thus by means of a few colors, although following the same general principles throughout, they obtained a wide variety in their architecture.

G. Technical Considerations

Perishable color was applied to the imperishable forms. Colored materials, that is , a permanent polychromy, was not much favored by the classic Greeks. The broken tones of the marbles , of which the Romans made use, seem not to have been in accord with Grecian taste. The manufacture of brilliantly colored tiles seems to have been unknown by the Greeks. They were , accordingly, limited to the application of the pigments directly on the finished surfaces, and the fact that so many of these colors have been preserved speaks volumes for the technical perfection of their processes.

The delicate ornaments could not have been executed in any other manner, than by the painter's brush or pencil.

To their terra cottas, the Greeks succeeded in imparting colors that have withstood the ravages of centuries.

SECTION XIII

Influences on Later Styles

A. Pompeian or Graeco-Roman

Pompeian architecture, more than any other perhaps, was influenced by Graecian ideas.

The old Greek temple, called the Temple of Hercules (6th or 5th century B.C.) has some traces of color on the terra cotta spouts. (Gusman's Pompei, p. 319)

In the Tufa Period (2nd century B.C.) , polychrome decoration was used very sparingly for the architectural members. The stucco of the Ionic capital in the house of the Faun is white, as well as most of the capitals of the pilasters found in the houses, and the numerous Ionic cornices on the walls. But color was sometimes employed, as on the Corinthian columns and pilasters of the exedra of the same house, which are painted a deep wine color. The ornamentation of this period is a debased descendant of the Grecian, characterized by superficial elegance, together with an apparent striving after simplicity and an ill-concealed poverty of form and color. There is a blending of the Doric, Ionic and Corinthian elements, and frequently a marked departure from the original proportions. The entablatures of the temples of the Tufa Period have all perished.

In the wall decoration of the House of Sallust, we find a Doric frieze with metopes painted red. The frieze under the Ionic cornices on the wall is usually made prominent with color, -- red , yellow or blue. A red frieze is seen in the peristyle of the house of the Black Wall above the pilasters of the garden wall. The lower stripe of the painted architrave in the house of the

Faun is painted yellow.

We must conclude that the stucco coatings on public buildings and temples were generally white, for the capitals and cornices, as well as on the shafts, columns, and external walls; colors were used to a limited extent on friezes, and perhaps on other parts of the entablature.

In the next period of Pompeian architecture, Roman rather than Grecian influence prevailed; there was also a revolt from tradition. Fantantastic forms appeared; the entablatures no longer retained the ancient division of architrave, frieze and cornice, but were made to represent a single broad band, sometimes however, with a projecting cornice. This band was ornamented by stucco reliefs, and it was frequently painted in bright colors. In some cases the stripe is divided into vertical panels: the broad ones corresponding to the intercolumniations, the narrow ones to the spaces above the columns. In many instances the background and part of the details of the ornament is white; but red yellow and blue were frequently used in all parts of the entablature.

The lower third of the columns was often painted a bright red or yellow. The desire for variety and brilliancy of color increased and was more pronounced in the years immediately preceding the eruption than at any previous time. (Mau's Pompeii, Chap. 51)

(For examples of colored architectural forms foun in Pompeii see Architecture Polychrome, Plate XXI.)

B. Roman Architecture

"The Romans seem to have been the first people to erect buildings of white marble or stone, unadorned by the painter's

brush." (Viollet-le-Duc in Transactions R.I.B.A., 1891, p.291) Nevertheless it is not necessary to believe that the Romans never painted their monuments. The fact that they were so attracted by the mural paintings of the Greeks, and removed such large numbers of them to Rome must have had some influence on their architecture. Hittorff (Arhhitecture Polychrome, p.316) insists that the Temple of Honor and Virtue must have been decorated in the Grecian style; that the architect Mutius could not have ignored the principles which directed the decorative arrnagements of the sanctuaries of Greece; and then the conqueror of Syracuse, in despoiling the Sicilian sanctuaries, must seen them decorated at that time with mural paintings and with movable objects of art; these circumstances must have coöperated, so that the temple which Marcellus had erected, was as far as possible, a perfect imitation, this monument being the first of its kind in which the products of Grecian art were exposed to Roman eyes.

Semper confirmed traces of color on the Roman monuments, such as the Coliseum, the Column of Trajan, and the Columns of Jupiter Stator; and these colors were traditionally handed down from the Greeks to the Romans. (Architecture Polychrome, p.54)

Concerning the coloring of the marvellous Roman decorations in stucco relief, we have no data, but it is not altogether improbable that some color was applied to them.

We may reasonably assume that the custom of coloring architecture must have survived to a greater or less extent in the Roman period, but that the esthetic nature of the Romans was incapable of appreciating the spiritual meaning of the color, just as it failed to comprehend the perfections of Grecian forms. The love of rich materials led the Romans to the use of the colored marbles,

and to develop a monumental system of polychromy, which, however, failed in purity of color. Rich mosaics superceded mural paintings, and the geometrical floor patterns gave way to pictures unsuited to their purposes. Mural painting did not entirely disappear, however, as we have noted numerous re mains in our section on Painting.

Some discoveries made half a century ago, during excavations for enlarging the Palais de Justice, Paris, brought to light walls covered with painted stucco coatings, like those found at Pompeii. These coatings not only show the same colors, the same kind of ornaments, but there are evident traces of painted figures , which leave no doubt as to the use of historical or mythological subjects, which served as a decoration in this ancient Roman edifice. (Architecture Polychrome, p. 193)

Some Roman paintings were also found at Saint-Medard-des-Prés in France which proved to be painted in the same manner as those at Pompeii.

C. The Mediaeval Styles

It is impossible to discuss within the limits of this paper the extent of the influence of Grecian polychromy on the art of the Middle Ages. There are so many threads to it, and they are so complicated, that it is worthy of separate research.

With the close of Justinian's reign (565 A.D.), the continuous living influence of antique culture was extinguished. The East merely preserved the antique tradition uncorrupted for a longer time, than did the West. By the 7th century, art in the West had sunk into oblivion , and it remained for the Carolingian Renaissance to restore it.

The Byzantine school forms the connection between the ancient art, which followed beauty for the sake of form itself, and the Christian art, which used form for the expression of an idea. Paintings in the Aghia-Labra (the principal church of Mt. Athos) date back to the first centuries of Christianity, to the days when Grecian art was not yet extinct. "The figures are executed in fresco by small hatchings, fine enough to disappear at a distance. The tones are very pale and do not pretend to compete with reality. The whole is tinted rather than painted." (M.Papety in Revue des Deux Mondes, June 18, 1847)

The great revolution in architectural forms in the East oblib-erated most Grecian ideas. The new style of the decoration of walls and vaults, affected by Persian influence, consisted principally in the incrustations of marble slabs and enamelled glass mosaics. But the colors so prized by the Greeks, - deep blue, rich red and green,- were preserved. The degeneration in drawing was probably the cause of the increased use of gold. The backgrounds, which had been deep blue, were finally made entirely of gold producing a very splendid effect. The Grecian use of the human form as an ele-ment of pictorial decoration was retained.

Antique models were studied more carefully than nature, which was detrimental to the growth of art. There was, however, a gradual growing away from the classic ideal.

The Christian paintings in the Catacombs may have been more nearly related to the Antique Style; their cheerful sentiment is of classic and not of Christian origin. (Woltmann & Woermann, History of Ancient Painting, p. 165)

With the Carolingian Renaissance, classic traditions in the

West took on new life, and when later in the 11th century, art had again fallen into decay, it was from the East that another revival came.

Remarkable mural paintings of a religious character have been preserved under the whitewash coatings of the Renaissance. They were executed in distemper, and bear witness to the most absolute antique tradition, for the general use of this complement of architecture. In 1845, investigations were made concernung the ancient paintings, which decorated the walls and vaults of the interior of the Cathedral of Brunswick. These are in the same style as those of the Italian churches, and also those in other German churches. The high walls, between bands of ornament about five feet apart, have horizontal bands of figures representing Biblical subjects. The compositions are treated in the style of bas-reliefs, the figures occupying almost the entire height of the field. The colors are placed, the outlines and details are drawn in black. The vaults are ornamented with various shaped compartments, the larger ones containing figures, the smaller ones foliage. Rich bands of foliage separate the compartments. The grounds are dark, usually blue. The heavy Romanesque forms were thus poetically clothed in light and color. (Architecture Polychrome, pp. 26-27)

The remains of color on the open timber roofs of the Middle Ages especially attract our attention. The beams of the roof of San Miniato at Florence, bearing the date 1357, have unusual interest for us because of the classic feeling which prevails throughout the entire structure. The beams are decorated in simple geometrical patterns on the chamfers and mouldings, - red and blue predominating, with white and green used sparingly. The green is used

chiefly on the brackets in the form of classic consoles. (Semper, Der Stil, Vol. 2, Plates XVII & XVIII, XIX & XX)

In the beautiful double hammer-beam roof over the nave of Knapton church, Norfolk England, the original coloring has been admirably preserved. The entire woodwork is painted a strong yellow; the decorations are in strong green and bright red, with black and white in small quantities. The angels have wings and robes alternately red and green. The garments of the saints under the canopies are painted in solid red or green. (Brandon's Open Timber Roofs of the Middle Ages, Plates 36, 37, 38, colored.)

The remains, which best enable us to judge of the use of colored ornament in the Middle Ages, are the illuminated manuscripts, that have been preserved. It seems especially appropriate that the use of rich colored decorations should have survived in the manuscript copies of classic literature. (For a full discussion of this subject see Labarte's Histoire des Ars Industriels, Vol 2, section on the illumination of manuscripts.)

The development of an individual an beautiful style of colored ornament in Ireland, at the time when Greek learning was in a more flourishing condition than in any other place outside of Greece, is a subject well worth investigating.

There is a close analogy between the painted figures of the saints in the illuminated manuscripts and the colored sculptures placed in the churches. Other ornament found in the decoration of manuscripts seems to differ but little from that of the larger surfaces.

In the Gothic period, especially in the North, the stained glass windows , which formed the chief color decoration, may be

compared in purpose to the mural paintings of the Greeks. In the earlier examples, the wonderfully rich red and blue prevailed, with yellow and green used sparingly, and white only for details. The black of the strong lead lines played its part in the color scheme. Later, when the Gothic style became more ornate, the strong colors of the glass were subordinated to the large white or gray surfaces, hatched with fine black lines to soften the light. The rich red and blue were introduced in small areas, and they flashed like jewels in their neutral settings; violet, green and yellow were also introduced. The stained glass windows served the same purpose in the decorative scheme of the Gothic period as the mural paintings in Grecian architecture. Is it going too far to see an analogy in the development of their color systems? The interiors shone with the same richness of color and decoration, although the forms were different. The sculptures of the Middle Ages were colored, in fact this seems to have always been a custom of the church, and it has survived to the present day in a more or less debased form. It must have been derived from antiquity,- a survival of an ancient pagan custom.

Polychrome sculpture was still extant in the Renaissance period. (See Leader Scott's The Renaissance in Italy, p. 41) But with the beginning of the Renaissance, the chain of ancient Grecian influence ends; not that color was not used in this period, but that used grew out of the new ideas, or it was merely left over from the Mediaeval period, and not the result of any real active influence. The almost total dearth of art in Italy in the 11th and 12th centuries seems to have extinguished the last feeble rays of antique tradition. The revival of the arts was begun anew

but without any recognition of the principles of color in antique Grecian architecture.

SECTION XIV

The Application of Color to Modern Architecture

We realize that we are treading on dangerous ground when we undertake to lay down any set rules deduced from the study of the principles of Antique polychromy. We do not advise the wholesale adoption of the system of Grecian color in modern decoration, any more than we would recommend the copyingof a Grecian temple in a modern office building. But the principles we have deduced from our study are applicable in all periods.

The application of color to our modern surfaces of concrete would seem to the inexperienced to be a very simple matter, but it is,in reality, one that requires much careful thought, if a truly beautiful and satisfactory result is to be achieved. To misapply color is as bad as to avoid it altogether, - either course is unpardonable. To apply it indiscriminately to all parts of the architecture is a mistake.

Let the large unbroken surfaces be of a pleasing tone. Some steps should be taken to protect it from the smoky atmospheres of our cities.

Let the ornaments and mouldings be in strong pure colors, especially suited to architectural forms. The string courses should be indicated by color. It ought to be possible to apply delicate colored ornament with a brush in the sheltered parts and treat them in a durable manner. Soffits and jambs around openings might be treated in deep colors and decorated with fine ornament, according to the importance of the building and the amount of richness desired. Parts in shadow should be deep red or blue; parts in sunlight may be yellow, light blue or green. Friezes and cornices may

receive the greatest amount of decoration.

Certain parts of the building might be emphasized by a stronger color treatment; for instance, the base offers a specially interesting surface for color treatment in bold tones, but care must be exercised or the effect will be unpleasant. Dormers and pediments may also receive some special broad treatments, but painted ornaments should be avoided here , as a rule.

We should bear in mind that the color of the ornament must be subordinated to the the unity of the whole, and that proper restraint must be exercised in this respect.

It is to be hoped that sculpture used in connection with architecture may receive some color treatment, that will serve to bring out the forms and harmonize them with their surroundings.

The brilliantly colored tiles and terra cottas, which our modern ceramists are now producing, are especially suited to monumental color schemes, and they are already being recognized as a valuable adjunct to the decoration of concrete surfaces.

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